Heating Piping & Air Conditioning

Single copy price $2.00

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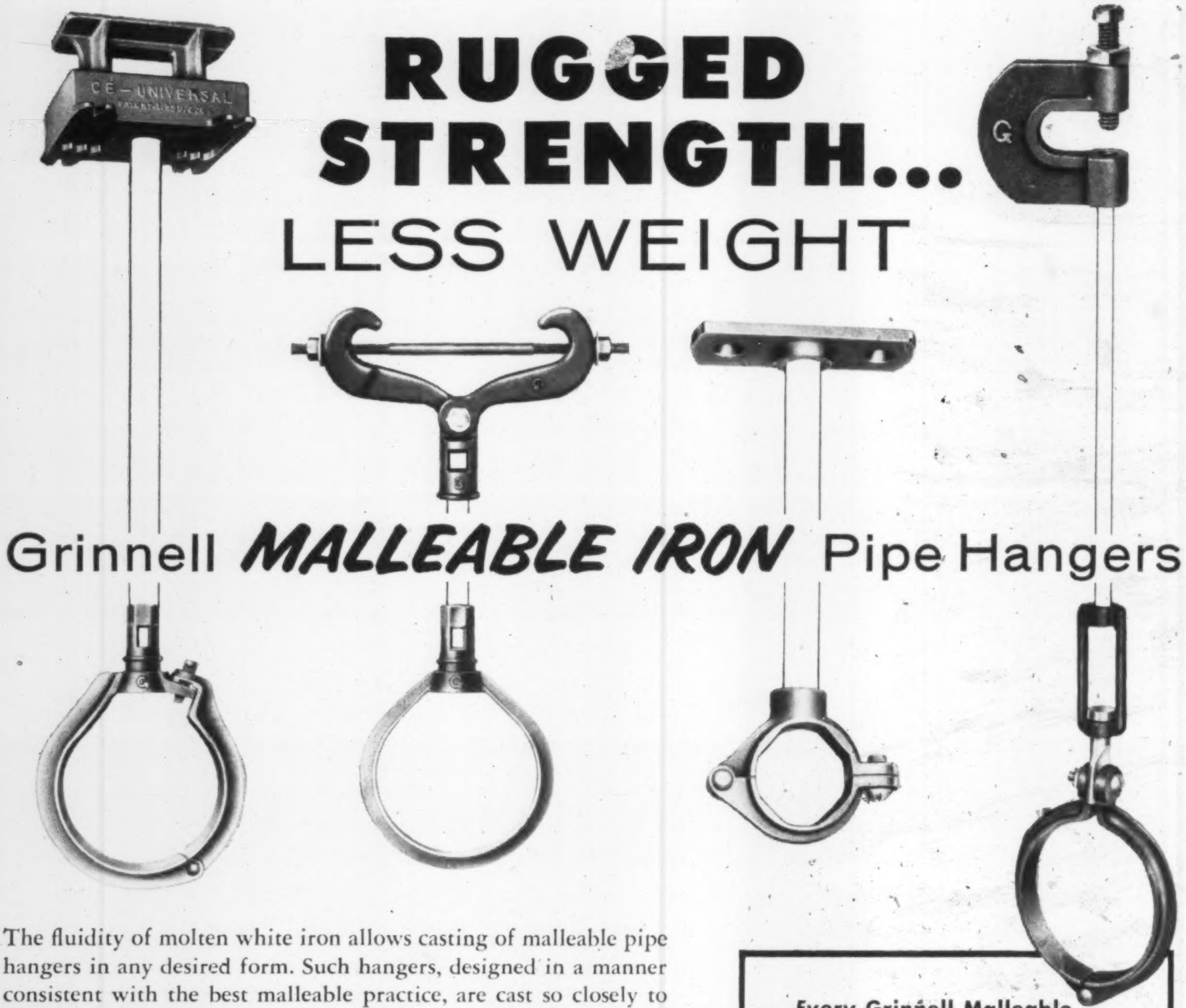
INDUSTRIAL • COMMERCIAL • INSTITUTIONAL • PUBLIC BUILDINGS

American Society of Heating and Air-Conditioning Engineers Journal Section—page 199

January 1958

DIRECTORY NUMBER

See the yellow pages for up-to-date product information



RUGGED STRENGTH... LESS WEIGHT

Grinnell *MALLEABLE IRON* Pipe Hangers

The fluidity of molten white iron allows casting of malleable pipe hangers in any desired form. Such hangers, designed in a manner consistent with the best malleable practice, are cast so closely to dimensions that subsequent shaping is not required.

Controlled annealing in the most modern equipment is employed to produce hangers having uniform internal grain structure, superiority ductility, high strength and freedom from casting strains. Quality controls in our foundries — such as hourly checks of metal, daily photomicrographs of metallurgical structure, tensile tests of sample bars from each melt — insure the rugged, lightweight strength of Grinnell malleable iron pipe hangers.

This start-to-finish manufacture by Grinnell assures malleable iron pipe hangers with a minimum safety factor of 5 or more, based on the ultimate tensile strength of the material.

The A.S.A. Code permits the use of malleable iron pipe clamps, embracing the pipe, when the temperature of the pipe does not exceed 450°F. When it does exceed this temperature, malleable iron may still be used in beam clamps, hanger flanges and the like if the malleable part is 12 inches or more distant from the pipe.

Testing metal structure
with photomicrograph

Every Grinnell Malleable Iron Pipe Hanger offers . . .

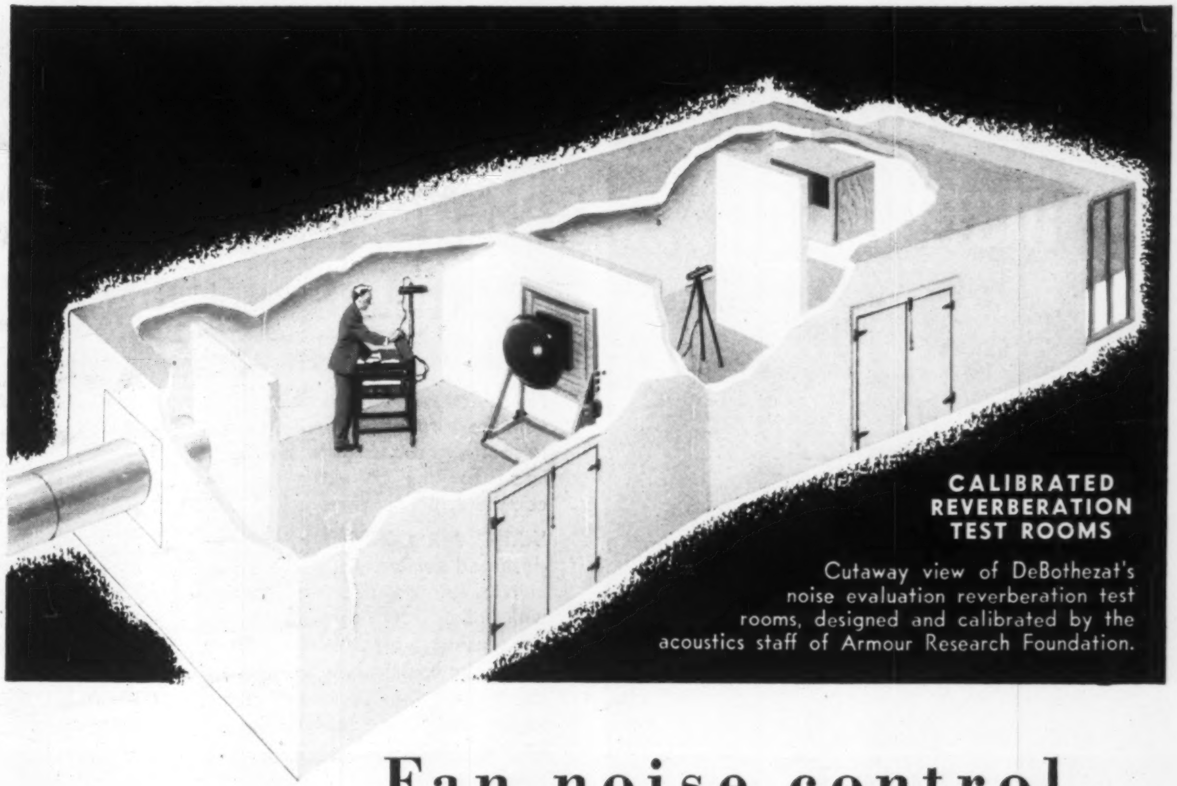
- Safety Factor of at least 5
- Thickness of metal increased at points of concentrated stress
- Homogeneous metal composition throughout
- Extremely high resistance to impact and corrosion
- Economy
- Heat resistance up to 450°F

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island **Coast-to-Coast Network of Branch Warehouses and Distributors**

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems



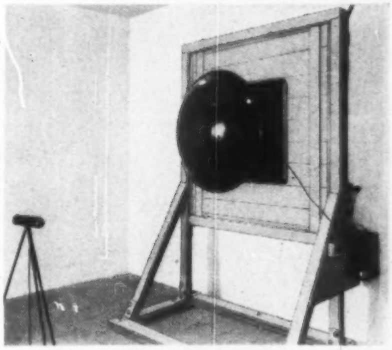
CALIBRATED REVERBERATION TEST ROOMS

Cutaway view of DeBothezat's noise evaluation reverberation test rooms, designed and calibrated by the acoustics staff of Armour Research Foundation.

Fan noise control begins Here

THESE REVERBERATION ROOMS are only a part of DeBothezat's continuing research program devoted to *predicting and reducing fan noise.* It's here that DeBothezat obtains the sound-output ratings (on both inlet and outlet sides) that are now available on all DeBothezat fan units, tested as a complete assembly.

Ratings are stated in both microwatts sound power and decibel sound pressure level in each of 8 octave bands of frequencies, measured separately. Next time you specify or install fans, ask your DeBothezat Sales Engineer for full information.



Interior view of the air outlet side of a DeBothezat noise evaluation reverberation test room, with a Power-Flow Roof Ventilator on test. Sound-level meter and microphone are in position — octave band analyzer not shown.

"Controlling Ventilation Noises"

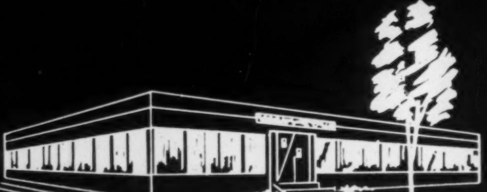
$2 PREPAID

when requested on your business letterhead

De Bothezat FANS
A DIVISION OF
American Machine and Metals, Inc.
Dept. HP-158, EAST MOLINE, ILLINOIS

IN CANADA: Represented by DOUGLAS ENGINEERING CO., Ltd., Toronto • Montreal

For simplified installation... select heat-x

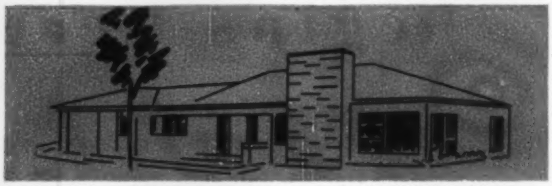


AIR COOLED PACKAGE CHILLERS
REMOTE CONDENSING UNIT ASSEMBLIES

No selection problems or engineering headaches with these reliable HEAT-X units! No components to match and assemble. Simply pick the unit you need for the capacity required. Each unit is complete, pre-engineered, "packaged".

'ARPC' AIR COOLED PACKAGE CHILLERS are designed primarily for residential and light commercial air conditioning applications. Furnished with 2, 3 or 5 HP compressors, Inner-Fin air cooled condensers, water chillers, superheaters and all necessary controls. Chiller is of patented Inner-Fin construction with all copper and brass water passages, completely eliminating the rust problem.

'RCU' REMOTE CONDENSING UNIT ASSEMBLIES are designed for use with remote direct expansion coils and consist of 2, 3 or 5 HP compressors, Inner-Fin air cooled condensers, superheater and all necessary controls.



ALL UNITS FEATURE:

Condenser of air cooled type with high efficiency Inner-Fin coil.

Superheater-Heat Interchanger of exclusive Inner-Fin construction which combines the advantages of the heat interchanger with the additional advantage of a superheater—insuring full use of the evaporator surface for cooling. Additional liquid subcooling improves overall system performance.

Cabinet finished in blue aluminum paint, suitable for indoor or outdoor installation.

Request Catalog No. 8027 containing complete specifications.

HEAT-X, Inc.

SUBSIDIARY OF DUNHAM-BUSH, INC.

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AIR CONDITIONING • REFRIGERATION • HEATING • HEAT TRANSFER
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Heating Piping & Air Conditioning

Vol. 30, No. 1

(With which is merged the Aerologist)

DESIGN, INSTALLATION, OPERATION
AND MAINTENANCE IN
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Some Things to Think About Steam Traps

...in order to get high operating efficiency and a minimum of maintenance

The gentleman who invented the wheel had a basic idea and so far no one has come up with anything better for the purpose.

If you'll pardon us for a little overemphasis on the significance of steam traps, we'd like to liken one of them to the wheel.

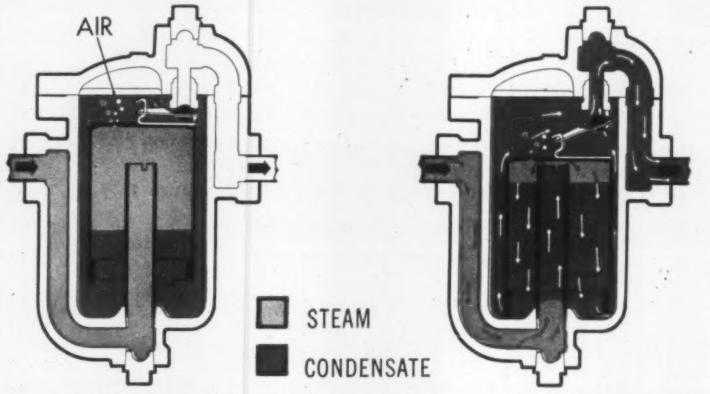
In 1911, when the first Armstrong inverted bucket steam trap model was announced to the world, or at least that part of the world that modest advertising and sales budgets would cover, it was not received with equal enthusiasm by all (especially old-style trap makers). But, like the wheel, it managed to find its way into general use. And, nothing better has ever turned up for the purpose of draining condensate. As a matter of fact, the Armstrong trap has been very widely copied. Today, there are more inverted bucket traps draining process equipment than any other kind. Of these, there are more Armstrongs.

If this sounds like the boasting of a proud parent, give consideration to some fundamental requirements not met by all traps:

1. ***A steam trap should not leak steam.*** Some traps do, you know, because of the nature of their operating principle. No steam ever gets to the Armstrong trap orifice. The valve is always water sealed.

2. ***A steam trap should vent "air" as fast as it accumulates***—otherwise temperatures are reduced and corrosion is a problem. The Armstrong trap handles air very nicely. The vent in the bucket permits air to accumulate in the top of the trap, from where it is discharged when the trap opens. For extreme conditions like draining paper machine dryers, some jacketed kettles and certain other units, the vent is sized larger for the job. And, for handling big volumes of air during warm-up, a bucket with an auxiliary thermic vent really speeds up heating.

3. ***A steam trap should discharge condensate at steam temperature*** if you want to get maximum efficiency from the unit drained. And most people certainly do. If you have to wait for the condensate to cool, it's almost impossible to maintain maximum temperatures and prevent air build-up. You guessed it—the Armstrong trap opens for water, without dependence on temperature.



Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

4. ***A steam trap should be suitable for any return system.*** The Armstrong trap works just the same whether discharging to atmosphere, back pressure or vacuum. It has been conclusively proved that flash steam resulting from use of a bucket trap does not cause a problem in vacuum return systems. The flash condenses rapidly. It's the leaky traps that cause the headaches.

5. ***A steam trap should not be a "prima donna".*** Some kinds of traps take an awful lot of care and coddling. The Armstrong trap is a rough and ready type with a hardened chrome steel constitution (valve and seat, to be exact). It cleans itself of ordinary dirt and scale without choking up. Its 18-8 stainless parts stave off rust and corrosion. It resists wire-drawing and wear remarkably well. In fact, it stays on the job longer with less attention than any trap ever produced. Unless you live in Siberia, you can probably find a user around the corner who will tell you so from experience.

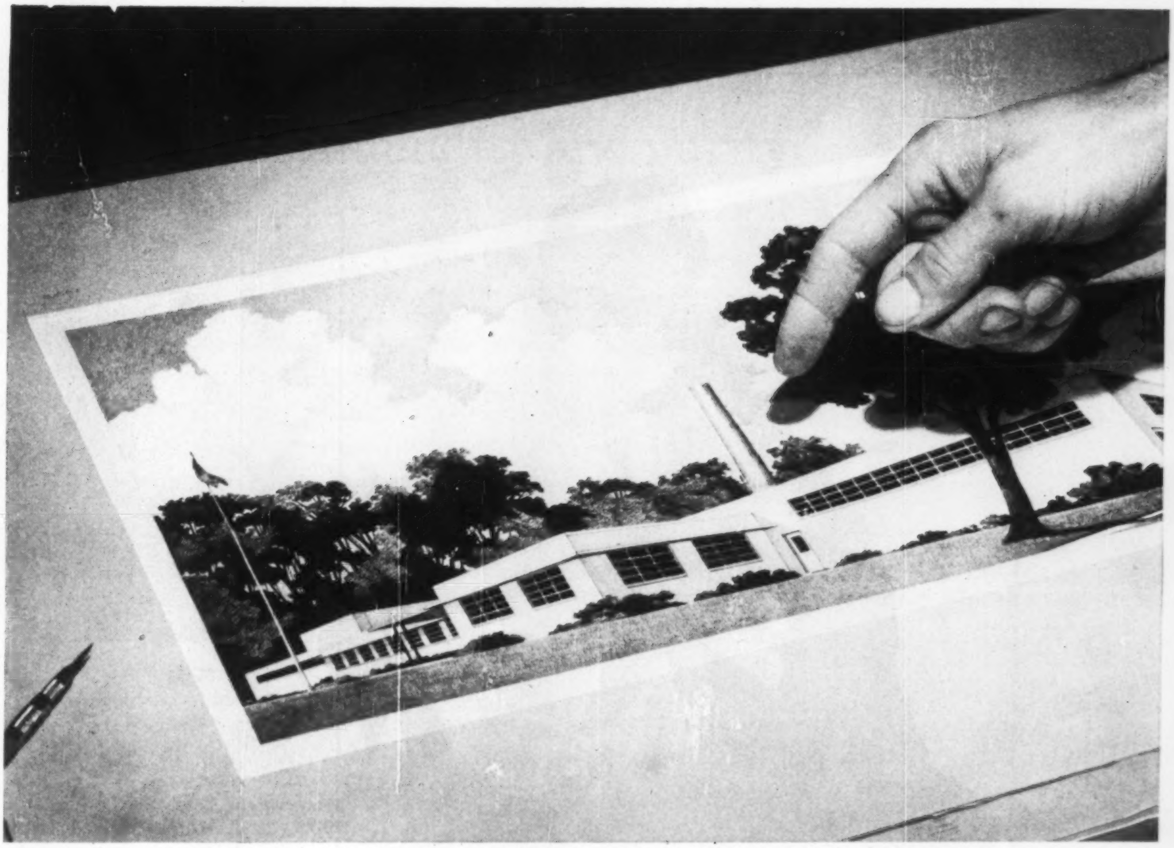
6. ***A trap should not be an "orphan".*** With Armstrong traps you can *always* get prompt service and parts from nearby Factory Representatives and stocking distributors as well as from the factory.

7. ***A trap should have a guarantee.*** The Armstrong trap is unconditionally guaranteed to give you *complete satisfaction* (as to doing its job, that is). If it doesn't, you can get your money back.

If you'd like to buy some of these excellent steam traps, call your local Armstrong Representative or write **Armstrong Machine Works, 8741 Maple St., Three Rivers, Michigan.**

ASK FOR the 44-page Steam Trap Book, free on request without obligation.

ARMSTRONG STEAM TRAPS



"*Now* we can get rid of that stack"

New Petro FORCED DRAFT burner for smaller boilers (OIL, GAS OR COMBINATION GAS-OIL)

This advanced Petro forced-draft burner is as compactly built and service-free as your home oil burner; yet it delivers some surprising extra values.

First, built into it is a complete combustion system, with forced draft air supply, fuel systems and prewired integral control panel—all assembled and tested at the factory.

Second, it eliminates the need for a high stack, yet requires no induced draft fan.

Third, a burner head of new design cures the old problem of flame pulsation, in both gas and oil firing—in either natural draft or pressurized boilers.

Finally, it is available for either light oil or gas firing—or a combination of both—with instantaneous change of fuel under either automatic or manual control.

Available as a complete burner unit for easy application to any type of boiler, from 18 to 92 bhp. Also available in a complete boiler-burner unit (with Scotch boiler) delivered at site, ready for service connections. For full description and specifications, please mail coupon.

See Petro Catalog in Sweet's Architectural File

Makers of Quality Heating and Power Equipment since 1903

PETRO

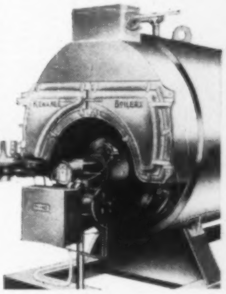
T. M. REG. U. S. PAT. OFF.

Forced draft . . . no stack or induced draft fan required.

No flame pulsation.

Single or dual-fuel firing.

Complete unit with Scotch boiler; or burner only for use with any type boiler.



PETRO
3231 West 106th Street
Cleveland 11, Ohio
(In Canada: 80 Ward Street, Toronto, Ontario.)

Please send me information on Petro P-240 Forced Draft Gas-Oil Burner.

Name ....

Company ....

Address ....

City .... State ....

No. 5 of a series

"I got rid of that cold sweat

Kathabar systems control all air dimensions... temperature, humidity and purity"

You will earn maximum profits from an investment in comfort air conditioning if you specify a Kathabar "full-dimensional" system.

All over the country, Kathabar systems have improved labor productivity in hot and soggy weather, reduced absenteeism, and brightened employee morale.

These profits alone have justified the Kathabar equipment, but there are additional benefits which distinguish Kathabar air conditioning from conventional systems:

extra returns

The Kathabar system automatically conditions *all three* vital dimensions of air—temperature, humidity, and purity. Its control of humidity is a feature favored by users, because it eliminates the shock you feel when you enter or leave spaces conditioned by conventional refrigeration.

The system will either dehumidify or humidify.

specify bacteria count

Air purity is important for both comfort and health, and a Kathabar system contributes to each. Its chemical wash removes odors and dirt from the air. Even better, it kills over 97% of airborne micro-organisms. This drastically reduces the exposure of people and products to mischievous bacteria and molds.

With a Kathabar system, you can actually specify the maximum bacteria count you will tolerate in your space!

Dehumidification for comfort in a Kathabar system is usually accomplished with cooling tower or city water. Where refrigeration is included, the Kathabar system gives you top cooling efficiency with surprising savings in tonnage and horsepower. This is because the system handles latent loads with chemical absorption using lower cost water, and frees refrigeration to handle only the sensible loads.

Since dehumidification is direct (by a chemical absorbent) in a Kathabar system, you avoid the costs of overcooling and re-heating.

no carry-over

The absorbent will not vaporize or carry over into the air stream. With routine checking, it will maintain its effectiveness for years without replacement. The germicidal and bactericidal results are not affected by absorbent age or condition, or whether the system is humidifying or dehumidifying.

Be sure to check the Kathabar system if you want the greatest returns on your air conditioning investment.

who uses Kathabar systems

Kathabar systems make profits out of air for these industries:

Atomic Energy
Breweries
Cake Mix
Candy
Cellophane
Cellulose
Cereals
Chemicals
Coffee
Comfort
Compressors
Cookies
Electronics
Explosives
Film
Foundries
Gelatin
Glass
Glue
Gum
Hospitals
Hotels
Lacquer
Lenses
Machining
Matches
Marine
Meat
Offices
Ordnance
Paper
Pharmaceuticals
Plastics
Printing
Rockets
Rubber
Shellac
Sugar
Sanitaryware
Testing
Textiles
Transformers
Transistors
Vacuum Tubes
Varnish
Waterworks
Wire
Yeast

how they use Kathabar systems

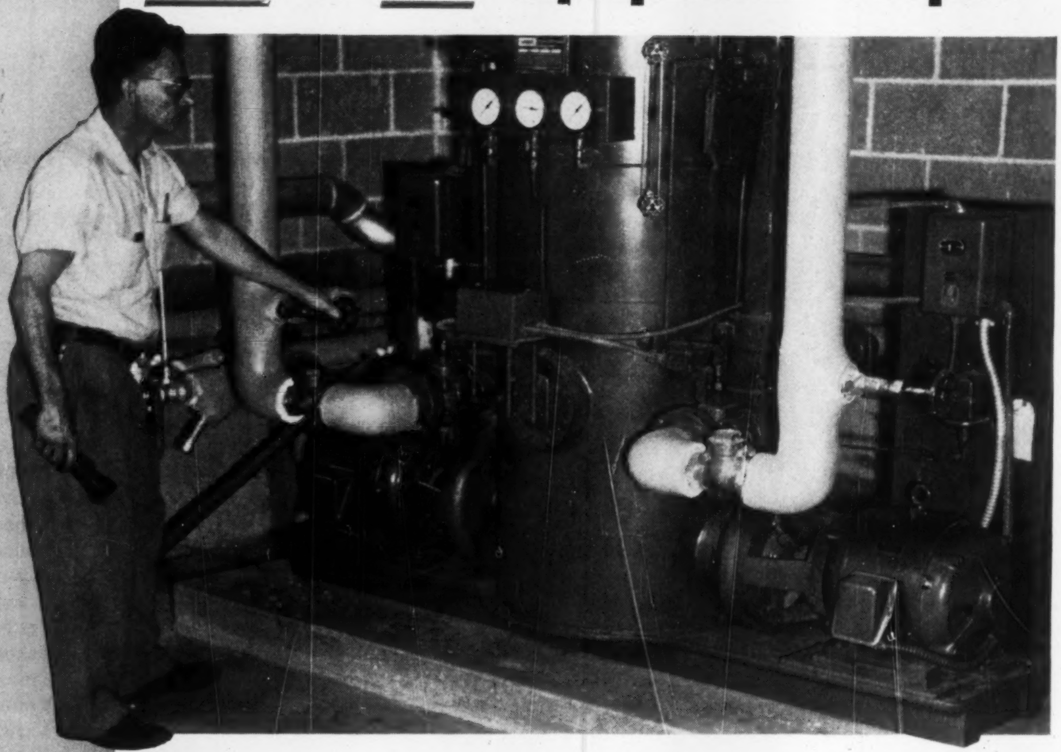
Many of these industries use Kathabar systems for comfort. Others use them to (1) maintain spaces at 80 F and 55% RH or lower; (2) obtain continuous air at sub-freezing dry bulbs and dew points; (3) eliminate condensation; (4) improve drying processes; (5) deliver continuous pure air.

send description of your problem

Air Conditioning & Drying Division
Surface Combustion Corporation
2384 Dorr Street Toledo 1, Ohio

Kathabar systems by **Surface**

You're *sure* of *full* equipment output



65,000-ft. EDR Capacity, Duplex Type Vacuum Return Line Heating Pump . . . powered by two 5 H.P. 1750 R.P.M. Close-Coupled Century Performance-Rated Motors.

with Century Performance-Rated© MOTORS

When your equipment is driven by Century Motors, you can be sure of top performance! The reason? Century offers an unusually wide range of size, speed, frame and torque characteristics to choose from. Equipment manufacturers can provide you with *exact* application of motor to job.

For circulating pumps, compressors, cooling towers, fans, blowers, stokers . . . whatever the installation, you'll be ahead with precision performance and customer satisfaction when Century Motors are furnished. Specify Century for replacement motors, too . . . call or write your nearby Century District Sales Office or Authorized Distributor.

Performance-Rated ©
MOTORS
1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

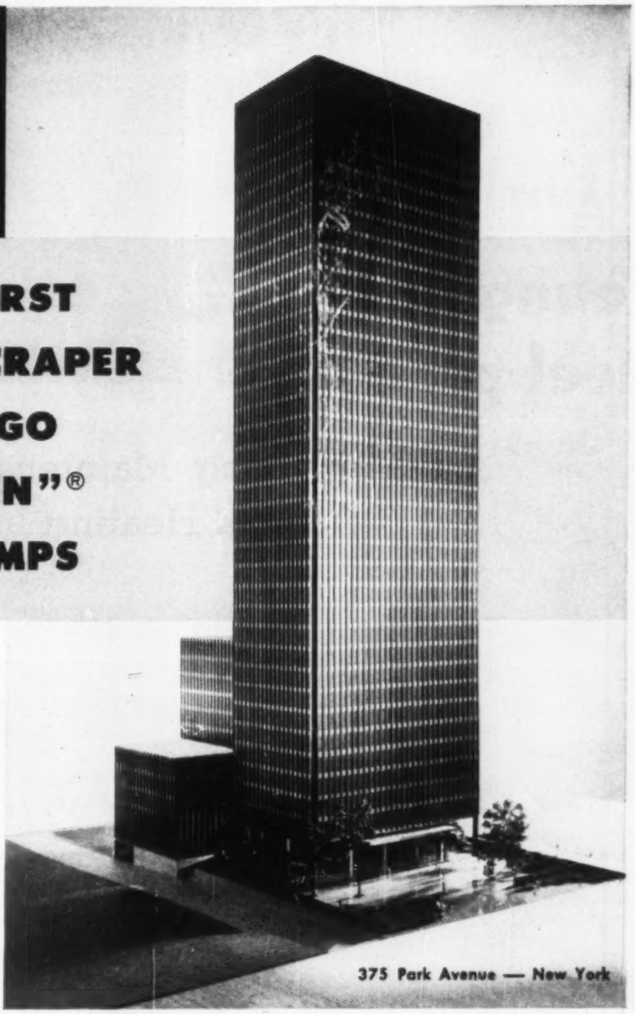
80

1806 Pine Street • St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

from Chicago

MODERN TODAY
MODERN IN 2007 A.D.

WORLD'S FIRST BRONZE SKYSCRAPER HAS CHICAGO "FLUSH KLEEN"® SEWAGE PUMPS



375 Park Avenue — New York

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associate architects

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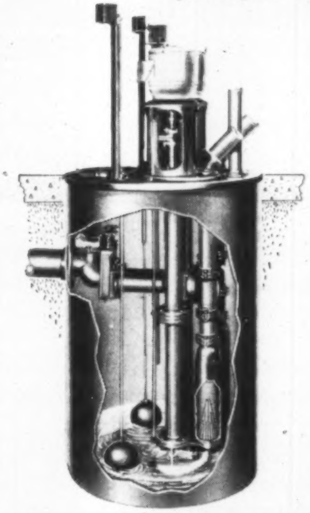
general contractors

EUGENE DUKLAUER, INC.
plumbing contractor



"FLUSH KLEEN"® Sewage Pump . . . . Automatically Backwashes Strainer . . . Strainer Keeps Solids From Basin and Pump . . . Water Only Handled By Impeller.

- The new 375 Park Avenue Building, New York, literally has EVERYTHING— and *everything* is QUALITY. Quality ideas, plans, materials and workmanship have provided such modern conveniences as year-round peripheral zoned air conditioning with balanced humidity and finger-tip control, 18 electronically controlled high-speed elevators, closed circuit color television, special non-glare exterior glass walls, etc. Chicago "FLUSH KLEEN"® Sewage Pumps have provided for continuous, trouble-free waste disposal service.

More than 12,000 Chicago "FLUSH KLEEN"® Sewage Pumps have been installed as standard equipment in fine buildings everywhere — and NOT ONE HAS EVER CLOGGED. Only liquid reaches the pump impeller. There is no contact between the pump's working parts and coarse sewage material.

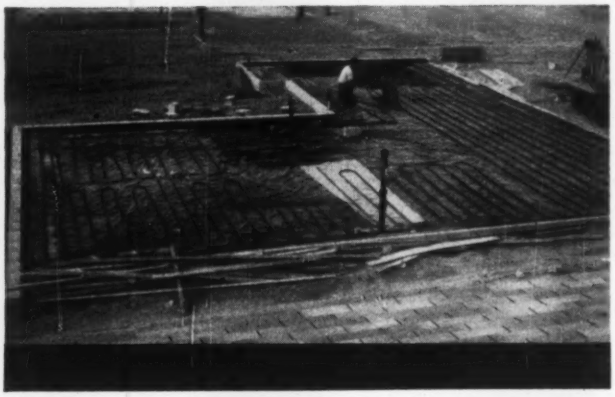
This is why Chicago Pump Company "FLUSH KLEEN"® Sewage Pumps have an unequalled record of clog proof performance and are preferred throughout the building industry.

CHICAGO PUMP COMPANY
Building Pumps

Subsidiary of Food Machinery & Chemical Corporation

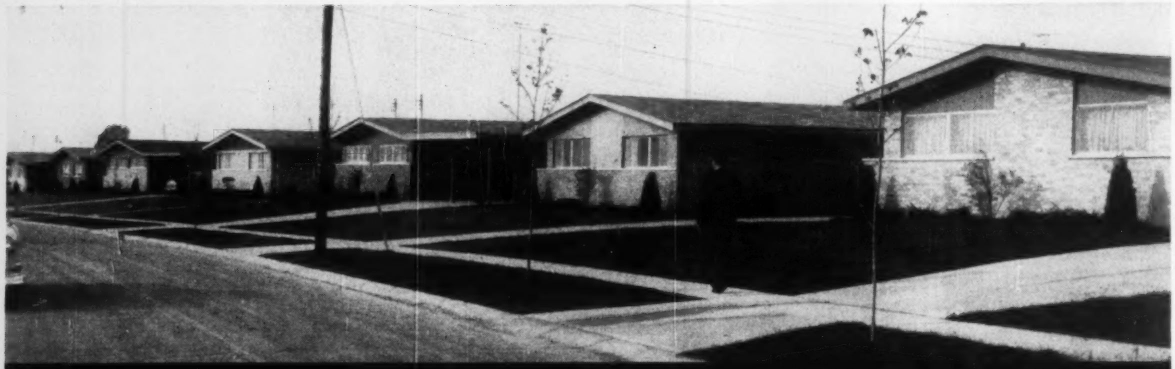
fmc FOOD MACHINERY AND CHEMICAL CORPORATION

622 Diversey Parkway
Chicago 14, Illinois



Youngstown steel pipe

. . . Gives Long, Maintenance-Free Life to Radiant Heating Installations



Youngstown Steel Pipe was installed by National Heating Co. in this 60-unit development of Modern Builders, Inc., both of Cincinnati, Ohio.

Specify Youngstown and secure these
7 Points of uniform goodness

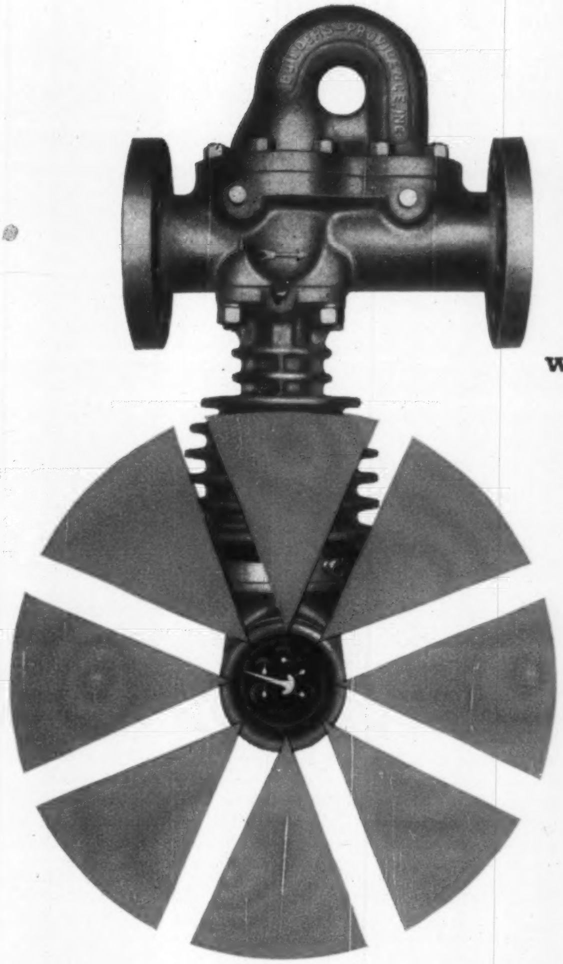
- uniform ductility
- uniform lengths
- uniform threading
- uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

Modern residential developments—like this 60-unit project off Cincinnati's Winton Road—demand only the most modern heating facilities. So, to afford these new homeowners warm, draft-free rooms of equalized temperatures, invisible radiant heating systems utilizing Youngstown Steel Pipe were installed.

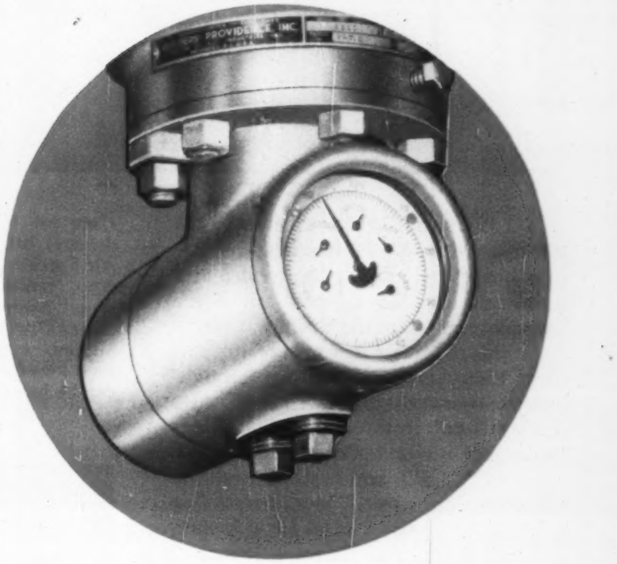
For years Youngstown Steel Pipe has been specified by leading architects as well as progressive plumbing and heating contractors for its dependability and long life. That's because it's made of only the finest steel by steelmen with over half-a-century of steelmaking knowhow. All Youngstown operations from ore mining to finish threading are closely quality-controlled to give you the best piece of pipe obtainable anywhere. Why not make Youngstown your specification for long, trouble-free installations?

For additional information or service, contact your local Youngstown distributor—or phone our nearest District Sales Office, today.



NOW! STOP STEAM GIVE-AWAY

with this Pressure-Compensated Counter . . . for users of Builders-Providence Shuntflo® Steam Meters



NEW UNIT adapts Shuntflo to applications having wide pressure fluctuations

METER READING is automatically and continuously corrected for line pressure variations

SELF-OPERATED, self-contained counter unit — no external power source required

EASILY INSTALLED on all models of the service-proven Shuntflo

PROVIDES closer accounting of steam consumption by area, building, or process.

INVESTIGATE this **PRESSURE COMPENSATED COUNTER** which comes as a "complete package" . . . ready to start adding up *steam savings* for you!

A NEW STAR in steam metering, this unit offers a wide range of correction . . . in either direction (above or below) or both directions from normal pressure. It is also available with contacts for electrical operation of remote totalizers, demand meters, and recorders.

FREE BULLETIN shows how easy it is to install this unit and to change steam losses to profits. Request your copy of Bulletin 400-P1 today! Write Builders-Providence, Inc., 381 Harris Ave., Providence 1, R. I.

BUILDERS-PROVIDENCE
DIVISION OF
B-I-F INDUSTRIES B-I-F
METERS
FEEDERS
CONTROLS

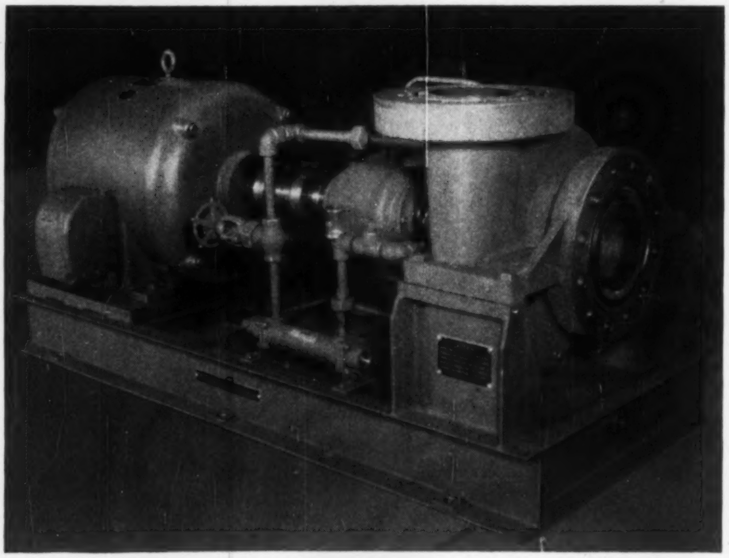
High Temperature Hot Water Central Heating Plant installs 16 Wilson-Snyder Pumps

Here are 9 of 16 pumps (without drivers) before shipment to the new Air Force Academy. These are heavy-duty, center-line-supported, single-stage pumps, with vertically split cases. One basic design in all sizes minimizes parts inventory requirements on the job. Single-stage pumps can be furnished with end or top suction connections. Only one water-jacketed stuffing box for conventional packing or mechanical seal is employed, and it is subjected only to suction pressure. In and out connections to the lantern ring are provided for sealing, flushing, recirculating, or bleeding-off pressure. Every pump is carefully tested before shipment.

16 Wilson-Snyder Centrifugal Pumps are now being installed in central heating plants for the service and academic areas of the new Air Force Academy at Colorado Springs, Colo.

In this relatively new field of application, there are now in service throughout the country over 200 Wilson-Snyder Centrifugal Pumps specifically designed for use under high temperatures (400°—500° F.) and high suction and discharge pressures. The complete line of Wilson-Snyder Pumps for this service includes 22 sizes for capacities up to 2000 gpm.

Complete information about Wilson-Snyder Pumps for central heating—as well as the complete line of Wilson-Snyder Centrifugal and Reciprocating Pumps—will be furnished on request.

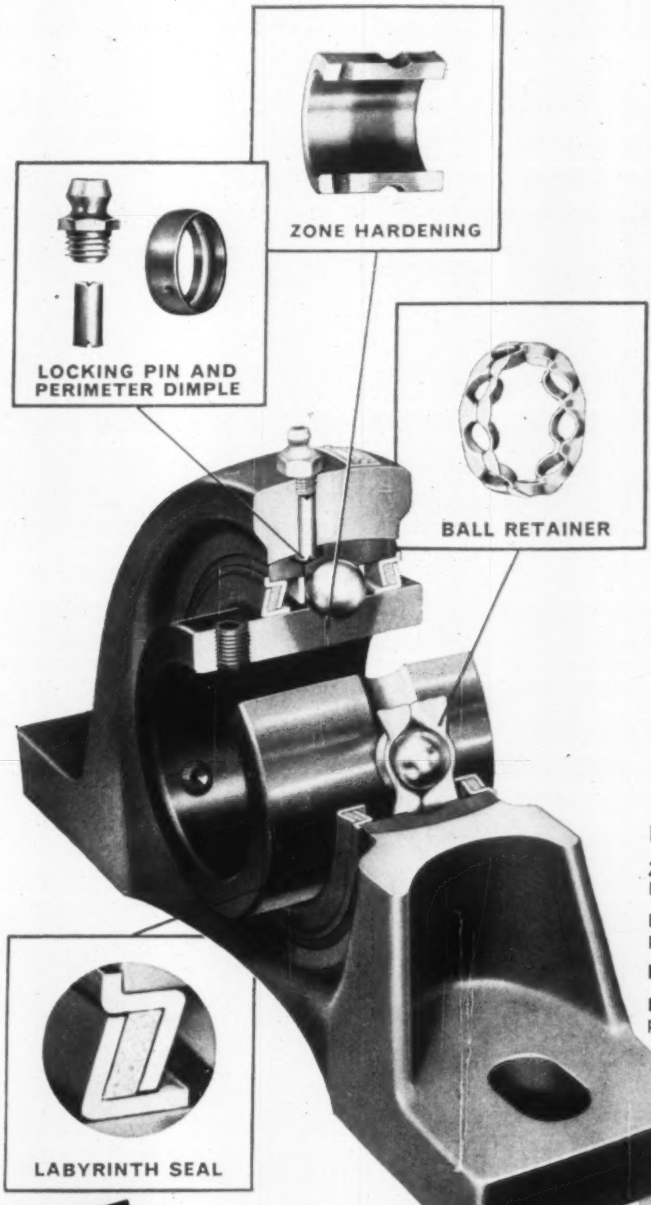


End-suction, top-discharge unit equipped with mechanical seal. Pumped liquid is circulated through heat exchanger and introduced at seal faces for cooling and flushing. Note that pump and integral suction flange is firmly supported at center-line to allow free expansion in all directions and to transmit pipe strains directly to foundation. Spacer-type coupling permits easy dismantling of pump without disturbing case, piping or driver alignment.

WILSON-SNYDER WORKS—Braddock, Pa., Oil Well Supply Division, United States Steel Corporation

WILSON-SNYDER PUMPS

UNITED STATES STEEL



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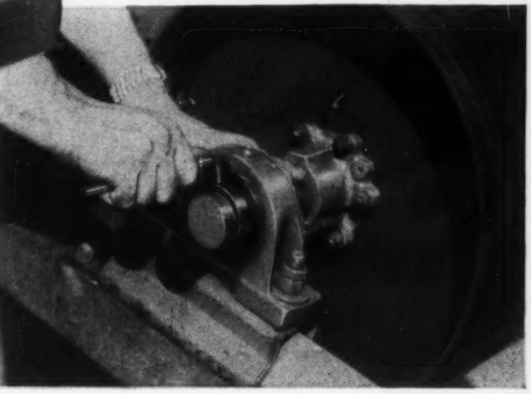

Write for Bulletin 454 for full information.

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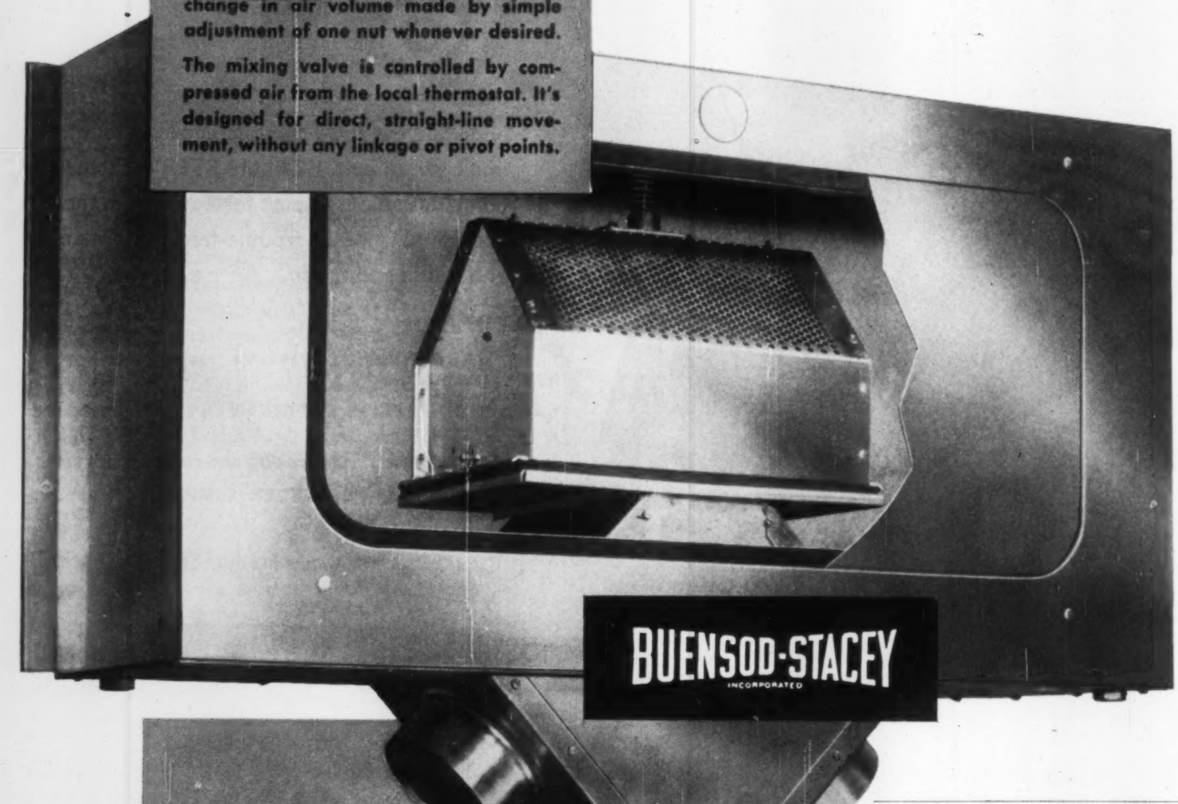
Buensod volume regulators maintain constant air quantity through each unit, regardless of variance of static pressures on either inlet or outlet of mixing valve.

Also: Independent of outside source of power such as compressed air or electricity . . . no control instrument to calibrate; nothing but a screw adjustment of spring tension . . . can be factory-set for desired volume and guaranteed within 5%, plus or minus that amount, when installed . . . change in air volume made by simple adjustment of one nut whenever desired.

The mixing valve is controlled by compressed air from the local thermostat. It's designed for direct, straight-line movement, without any linkage or pivot points.



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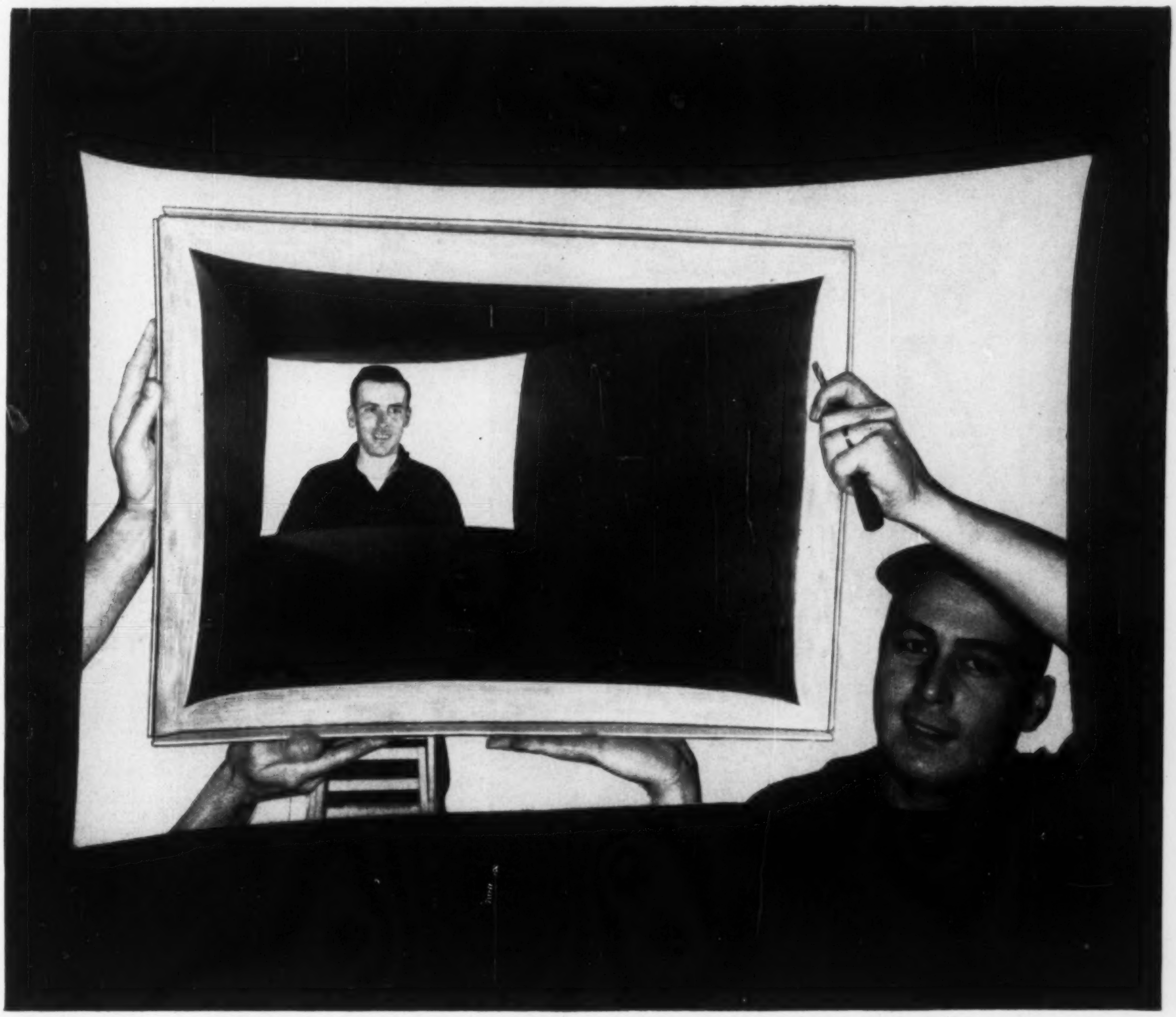

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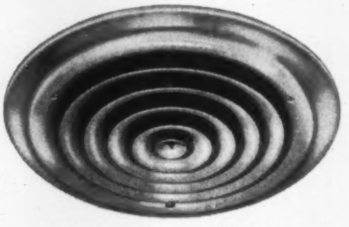
CONVENIENT CATALOG GIVES COMPLETE DETAILS AND ENGINEERING DATA. AVAILABLE FROM H&C JOBBERS OR DIRECT FROM US.



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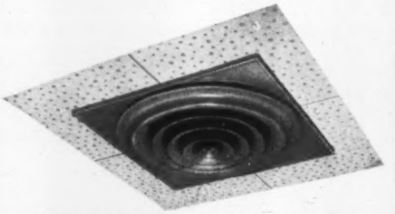
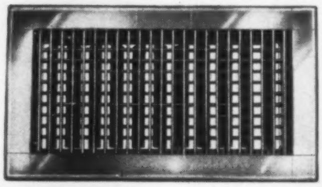


WITH H&C NO. 18 ADAPTER SQUARE



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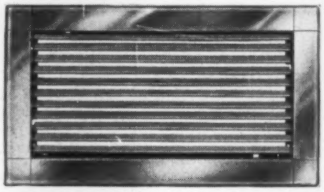

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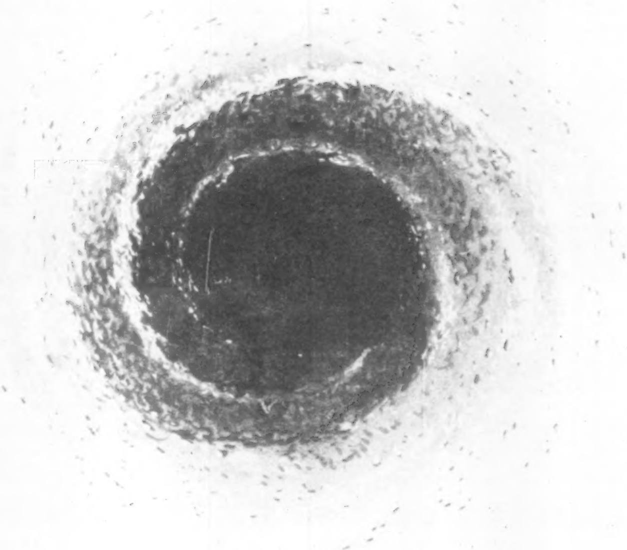

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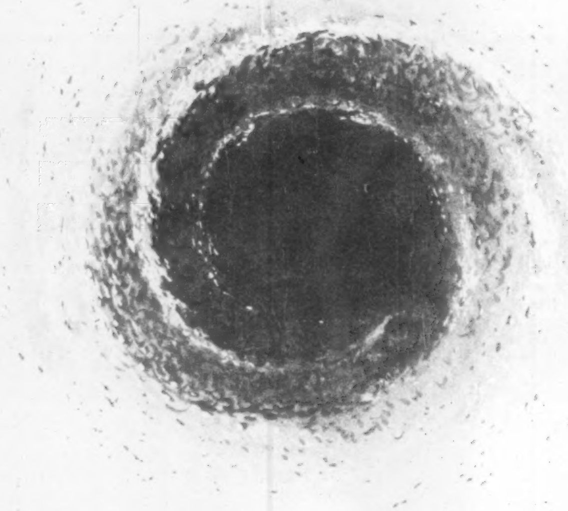

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HEATING, VENTILATING AND AIR CONDITIONING

1 **SYNCRETIZER UNIT VENTILATOR** The standard for classroom heating, ventilating, and natural cooling. Four models in 32" and 28" heights; 750 to 1560 CFM; steam or hot water—*Publication 101.*

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5 **THE MAINLINER** A quiet heating and ventilating unit for classrooms in certain milder localities. Four models: 500 to 1500 CFM; for use with forced hot water piping concealed by Wind-o-line enclosures in the economical Mainline System—*Publication 12-1.*

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7 **THE THERMOVENT** A large-capacity sound-insulated heating and ventilating unit for auditoriums, cafeterias, gyms. Wide choice of models and mountings; 1250 to 15,000 CFM—*Publication 20A1.*

8 **SILL-LINE RADIATION** High capacity perimeter heating in attractive wall-hung enclosures for offices, schools, hospitals, churches where comfort and beauty are important. Standard lengths, 2.9 to 12.7 sq. ft. EDR; every needed accessory—*Publication 30-1.*

9 **SILL-LINE IN STORAGE CABINETS** The advantages of perimeter heating plus the utility of attractive storage units (32" and 28" heights); 920 to 2750 Btu/lin. ft.—*Publication 30-2.*

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12 **LITTLE GIANT HEATER** Draw-through propeller fan units with universal heating elements for steam or hot water; 14 sizes, 34 models; 16,000 to 610,000 Btu/hr.; wide choice of vertical or horizontal discharge outlets; sound code rated—*Publication 402.*

13 **CABINET UNIT HEATER** Series A: versatile high-capacity units; seven basic sizes (265 to 1860 CFM) for steam (71 to 545 sq. ft. EDR) or hot water (9.1 to 120 MBH); recess, semi- or non-recess models; floor, wall, ceiling, inverted mounting—*Publication 403.*

14 **GAS-FIRED UNIT HEATER** Ten basic sizes, A.G.A. approved for use with all gases; 25,000 to 250,000 Btu/hr. input; 400 to 3600 CFM; attractive, compact, lightweight—*Publication 280.*

15 **ROOMMATE AIR CONDITIONER** Year-round cabinet conditioner for offices, apartments, etc. Seven sizes: 300 to 1400 CFM; 1 to 5 tons cooling; 35 to 100 MBH heating. Recess, semi-recess and non-recess units for floor, wall or ceiling—*Publication 600-1.*

16 **SERIES M AIR CONDITIONER** For year-round heating, ventilating and air conditioning in stores, offices, showrooms, etc. Nine models: 1250 to 15,000 CFM; 3 to 60 tons cooling; 40 to 1500 MBH heating, steam or hot water—*Publication 601-1.*

17 **SERIES G HEATING & VENTILATING** A general purpose unit for auditoriums, gymnasiums, stores, showrooms, etc. Twelve basic sizes: 1000 to 15,700 CFM; 36 to 1390 MBH heating capacity; 18 steam or hot water elements; four mountings—*Publication 500-1.*

18 **BLOWER FAN EXHAUSTER** Quiet-operating air handling units with sound absorbing silencer; 12 basic sizes; one, two or three fans; air deliveries, 1000 to 22,700 CFM—*Publication 21-1.*

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20 **HEATING & COOLING SURFACE** Three famous Nesbitt lines: *Series W* water surface: type WB, without drain; and WD, nonfreeze drainable type, pitched within casing—*Publication 246.* Type WC, cleanable tubes and removable headers—*Publication 255.* *Series H* general purpose blast coil surface for heating, ventilating, air conditioning and drying applications—*Publication 248.* *Series T* surface with trombone steam-distributing tubes; eliminates stratification and the danger of freezing under modulated valve control; ideal for preheating outdoor air—*Publication 305.*

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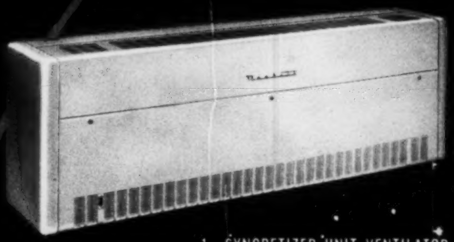
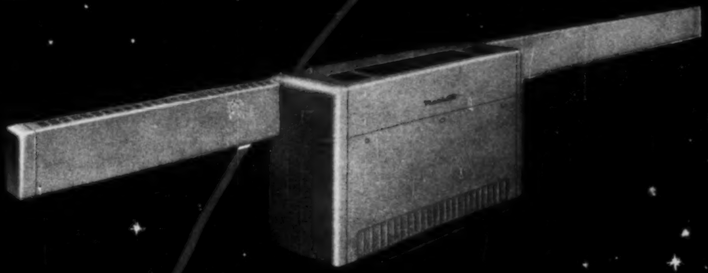
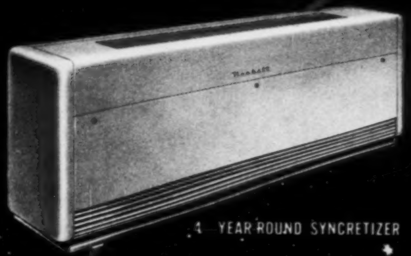


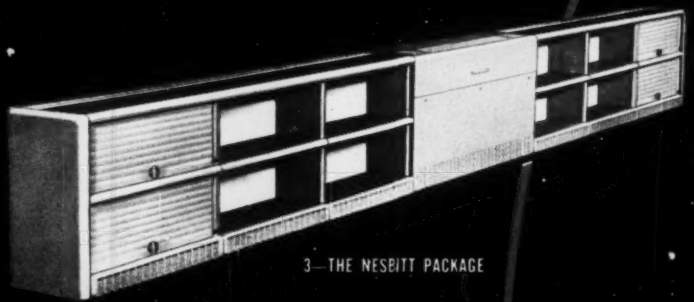
1—SYNCRETIZER UNIT VENTILATOR



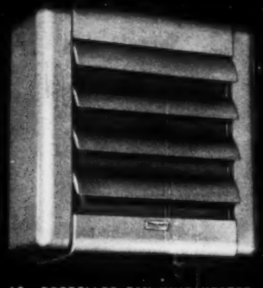
2—SYNCRETIZER AND WIND-O-LINE RADIATION



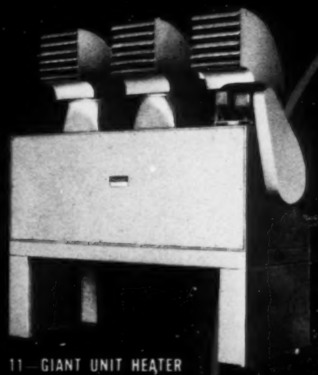
4—YEAR ROUND SYNCRETIZER



3—THE NESBITT PACKAGE

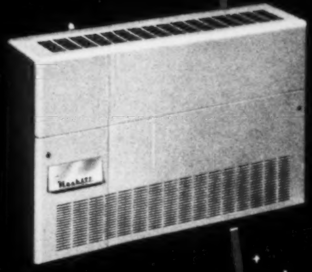


10—PROPELLER FAN UNIT HEATER

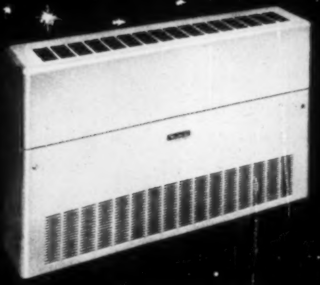


11—GIANT UNIT HEATER

14—GAS-FIRED UNIT HEATER



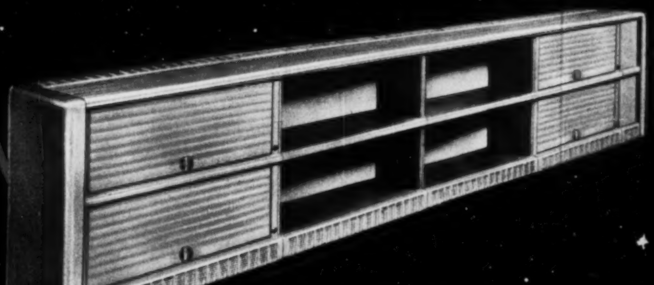
15—ROOMMATE AIR CONDITIONER



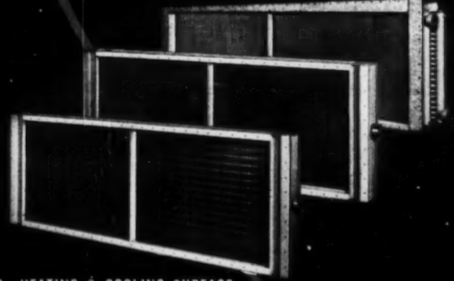
13—CABINET HEATER

12—LITTLE GIANT UNIT HEATER

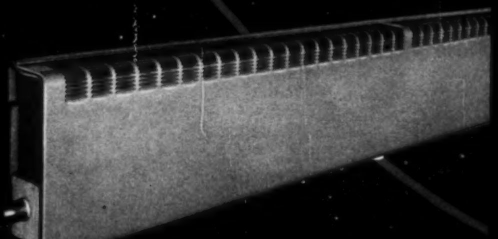
THERMAL COMFORT



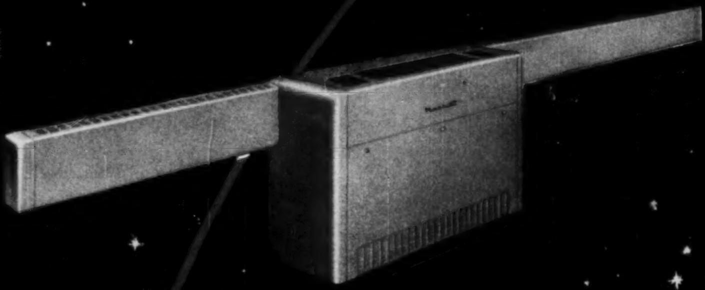
9—SILL-LINE IN STORAGE CABINETS



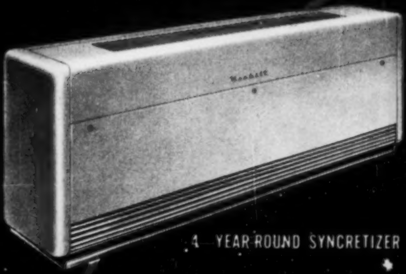
20—HEATING & COOLING SURFACE



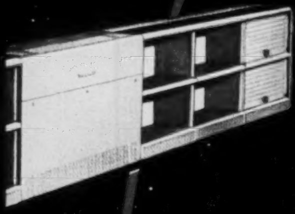
8—SILL-LINE RADIATION



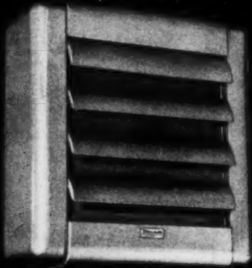
2—SYNCRETIZER AND WIND-O-LINE RADIATION



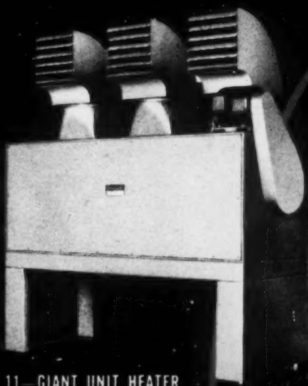
4—YEAR-ROUND SYNCRETIZER



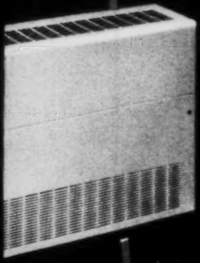
ITT PACKAGE



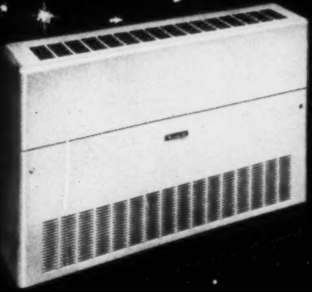
10—PROPELLER FAN UNIT HEATER



11—GIANT UNIT HEATER



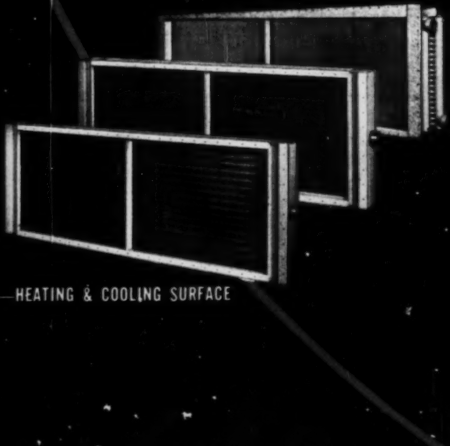
OMMATE AIR CONDITIONER



13—CABINET HEATER

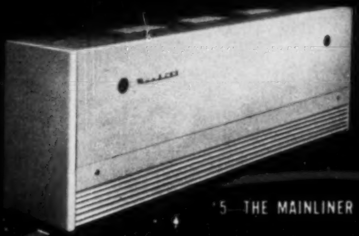
12—LITTLE GIANT UNIT HEATER

THERMAL COMFORT

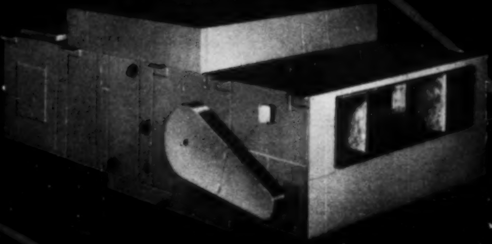


20—HEATING & COOLING SURFACE

8—SILL-LINE RADIATION

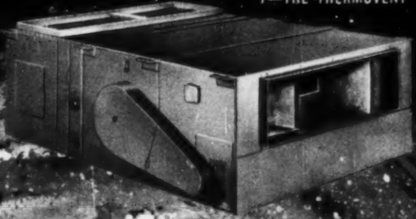


5—THE MAINLINER



6—THE AUDICON

7—THE THERMOVENT



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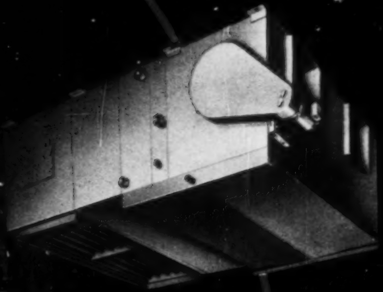

16—SERIES M AIR CONDITIONER

17—SERIES G HEATING & VENTILATING

18—BLOWER FAN EXHAUSTER

19—BASEBOARD RADIATION

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City and State	Street Address	Telephone
Akron 8, Ohio (ABC)	707 United Bldg., 9 S. Main St.	Hemlock 4-3181
Albany, New York (JJN)	773 New Loudon Rd., Latham	State 5-8516
Albuquerque, N. M. (ABC)	4807 Lomas Blvd., N. E.	3-2247
Allentown, Pa. (JJN)	1206 E. Congress Street	Hemlock 2-6205
Atlanta 5, Georgia (ABC)	3224 Peachtree Rd., N. E.	Exchange 8604
Baltimore, Md. (JJN)	33 East 21st Street	Belmont 5-5895
Billings, Mont. (ABC)	3 M & R Bldg., 1002 Division St.	2-0800
Birmingham 9, Ala. (ABC)	1206 South 20th Street	Alpine 2-2382
Boston, Mass. (JJN)	70 Jaconnet Street, Newton Highlands 61, Mass.	Lasell 7-7100
Bryn Mawr, Pa. (JJN)	765 West Lancaster Avenue	Lawrence 5-8585
Buffalo 16, N. Y. (JJN)	1441 Hertel Avenue	Export 2200
Charleston 23, W. Va. (ABC)	1029 Virginia Street, E.	61-331
Charlotte 2, N. C. (ABC)	1202 Commercial Bank Bldg.	Edison 3-8444
Chicago 1, Ill. (ABC)	228 North LaSalle Street	Financial 6-2531-7
Cincinnati 2, Ohio (ABC)	1005-6 American Building	Parkway 1-8160
Cleveland 15, Ohio (ABC)	1010 Euclid Avenue	Main 1-6846
Columbus, Ohio (JJN)	101 North High St,, Rm. 301	Capitol 4-7559
Dallas 2, Texas (ABC)	1213 Texas Bank Building	Prospect 1879-70
Dayton 19, Ohio (JJN)	2600 Far Hills Avenue	Axminster 9-6717
Denver 4, Colo. (ABC)	1304 Cherokee Street	Main 3-3179
Des Moines, Iowa (ABC)	506 Securities Building.	8-5691
Detroit 2, Mich. (ABC)	632 Fisher Building	Trinity 2-4300
Duluth 2, Minn. (ABC)	408 Christie Building	Randolph 2-6429
East Orange, N. J. (JJN)	589 Central Avenue	Orange 5-1191
Evansville 8, Ind. (ABC)	611 Court Building	Harrison 2-3314
Fort Wayne 6, Ind. (ABC)	Rm. 51, 3001 Fairfield Ave.	Harrison 8813
Grand Rapids 2, Mich. (ABC)	211 Assn. of Commerce Bldg.	Glendale 8-1357
Green Bay, Wisc. (ABC)	308 Main Street	Hemlock 5-3520
Greenville, S. C. (ABC)	Conway Building	2-4286
Harrisburg, Pa. (JJN)	835 South 13th Street	Cedar 8-8144
Houston 2, Texas (ABC)	1909 Travis Street	Capitol 7-6171
Indianapolis 4, Ind. (ABC)	619-21 Archts & Builders Bldg.	Melrose 5-4521
Jackson 4, Miss. (ABC)	2902 Oak Forest Drive	5-5814
Jacksonville 7, Fla. (ABC)	#203, 1201 San Marco Blvd.	Exbrook 8-0826
Johnstown, Pa. (JJN)	206 Fisher Building	Johnstown 9-4108
Kansas City 5, Mo. (ABC)	330 Dwight Building	Victor 2-7181-2
Knoxville 16, Tenn. (ABC)	1301 Hannah Avenue, N.W.	4-1668
Little Rock, Ark. (ABC)	915 West Second Street	Franklin 6-1068
Los Angeles 17, Calif. (ABC)	506 Architects Building	Michigan 3871
Louisville 2, Ky. (ABC)	1622 Heyburn Building	Juniper 4-7109
Memphis 3, Tenn. (ABC)	668 South Main Street	Jackson 6-0339
Mexico City, Mex. (ABC)	San Juan deLetran #37, Apt. 403	35-3150
Miami 34, Florida (ABC)	220 Miracle Mile, Suite 241	Highland 8-3916
Milwaukee 3, Wisc. (ABC)	231 West Wisconsin Avenue	Broadway 1-6691
Minneapolis 3, Minn. (ABC)	410 Essex Bldg., 84 S. 10th St.	
Mobile, Alabama (ABC)	461 Government Street	Federal 9-7215
Nashville 5, Tenn. (ABC)	1805 Hayes Street	Chapel 2-1354
New Orleans 12, La. (ABC)	Rr. 305 Jahncke Bldg.	Tulane 7105
New York 7, N. Y. (JJN)	11 Park Place	Barclay 7-0260
Oklahoma City 2, Okla (ABC)	703 Leonhardt Building	
Omaha 2, Nebr. (ABC)	305 Patterson Building	Atlantic 7464
Peoria 1, Ill. (ABC)	517 Comm'l. Nat'l. Bank Bldg.	4-1041
Philadelphia 36, Pa. (JJN)	State Road & Rhawn Street	Devonshire 2-2400
Phoenix, Ariz. (ABC)	Central Madison Building	Alpine 2-4641
Pittsburgh 34, Pa. (JJN)	704 Castle Shannon Blvd.	Locust 3-0200
Portland 5, Ore. (ABC)	445 Pittock Block Building	Capitol 8-0696
Richmond 19, Va. (ABC)	202 E. Cary Street	Milton 4-3021
Rock Island, Ill. (ABC)	301 Safety Building	6-6425
Sacramento, Calif (ABC)	2115 J. Street, Suite #3	
St. Louis 1, Mo. (ABC)	1711 Railway Exchange Bldg.	Garfield 1-1208
Salt Lake City 1, Utah (ABC)	503 Deseret Building	Elgin 9-3120
San Antonio 5, Texas (ABC)	216 K-W Bldg., 401 W. Nueva St.	Capitol 4-8662
San Francisco 3, Calif. (ABC)	821 Market Street	Sutter 1-1024-5
Scranton, Pennsylvania (JJN)	1504 Adams Ave., Dunmore 9,	Diamond 3-7318
Seattle 9, Wash. (ABC)	1305 Republican Street	Seneca 4328-9
South Bend 1, Ind. (ABC)	402 Lafayette Building	Central 3-9305
Springfield, Mass. (JJN)	1140 Springfield Street Box E, Feeding Hills, Mass.	Republic 2-1878
Syracuse, New York (JJN)	510 Hills Building	Harrison 2-0471
Tampa 1, Florida (ABC)	P.O. Box 1221, 509 Twiggs St.	2-2506
Toledo 13, Ohio (ABC)	Rm. 201, 2446 Sylvania Ave.	Lawndale 7297
Tulsa 3, Okla. (ABC)	421 Wright Building	Luther 4-3366
Washington 14, D.C. (ABC)	7720 Wisconsin Avenue	Oliver 4-5223
West Hartford 7, Conn. (JJN)	P.O. Box 6983, 3115 Buffalo Dr.	Jackson 9-1777
Wichita 7, Kansas (ABC)	211 Davidson Building	Amherst 7-9943
Wilmington, Del. (JJN)	Rm. 15, 818 Market Street	Olympia 8-0233
Youngstown 5, Ohio (ABC)	208 Wagner Building	Sterling 8-6525

In Canada these products are sold through American-Standard Products (Canada) Ltd., P. O. Box 360, 310 Ellis Street, Windsor, Ontario.

GROUP 2

Complete sales and service for Nesbitt Baseboard Radiation, Giant, Little Giant, Propeller Fan, Cabinet Heater, Gas-Fired Unit Heater, Sill-line Radiation, Room-mate, AudiCon, Series G Heating and Ventilating Unit, Exhauster, Series M Conditioner, and Heating and Cooling Surfaces are provided by the following offices:

Albany, New York	773 New Loudon Rd., Latham	State 5-8516
Allentown, Pennsylvania	1206 East Congress Street	Hemlock 2-6205
Atlanta 13, Georgia	225 Moore Street, S.E.	Jackson 5-7508
Baltimore 18, Maryland	33 East 21st Street	Belmont 5-5895
Birmingham 9, Alabama	1831 28th Avenue, So.	
Boston, Massachusetts	70 Jaconnet Street, Newton Highlands 61, Mass.	Lasell 7-7100
Bryn Mawr, Pennsylvania	765 West Lancaster Avenue	Lawrence 5-8585
Buffalo 16, New York	1441 Hertel Avenue	Export 2200
Charleston 4, West Virginia	1905 Kanawaha Avenue, S.E.	Dickens 4-4415
Charlotte 2, North Carolina	200 S. Tryon Street, N.W.	Edison 3-8444
Cleveland 13, Ohio	1276 W. 3rd Street	Cherry 1-1581
Columbus, Ohio	101 N. High Street, Rm. 301	Capitol 4-7559
Dallas, Texas	5526 Dyer Street	Em 8-5131
Dayton 19, Ohio	2600 Far Hills Avenue	Axminster 9-6717
Denver 4, Colorado	Suite 15, Wheatridge Bldg.	Harrison 4-6628
Detroit 21, Michigan	20052 Livernois Avenue	Diamond 2-3848
East Orange, New Jersey	589 Central Avenue	Orange 5-1191
Ft. Worth 9, Texas	3816 W. Biddison Street	Walnut 7-5325
Harrisburg, Pennsylvania	835 South 13th Street	Cedar 8-8144
Houston 19, Texas	P.O. Box 6983, 3115 Buffalo Dr.	Jackson 9-1777
Indianapolis, Indiana	1531 Pennsylvania Street	Melrose 4-3463
Johnstown, Pennsylvania	206 Fisher Building	Johnstown 9-4108
Lancaster, Pennsylvania	1818 Divot Court	Express 4-9181
Los Angeles 4, California	310 North Normandie	Normandy 3-3995

GROUP 3

The following offices offer Nesbitt Heating and Cooling Surfaces exclusively:

Davenport, Iowa (JJN)	320 Western Avenue	7-6123
Des Moines, Iowa (JJN)	1112 Locust Street	Atlantic 8-5721
Greenville, South Carolina	104 East Stone Avenue	3-7488
Salt Lake City, Utah	44 West 8th St., South	Davis 2-2537
Tulsa 3, Oklahoma	Wright Building	Luther 4-7264

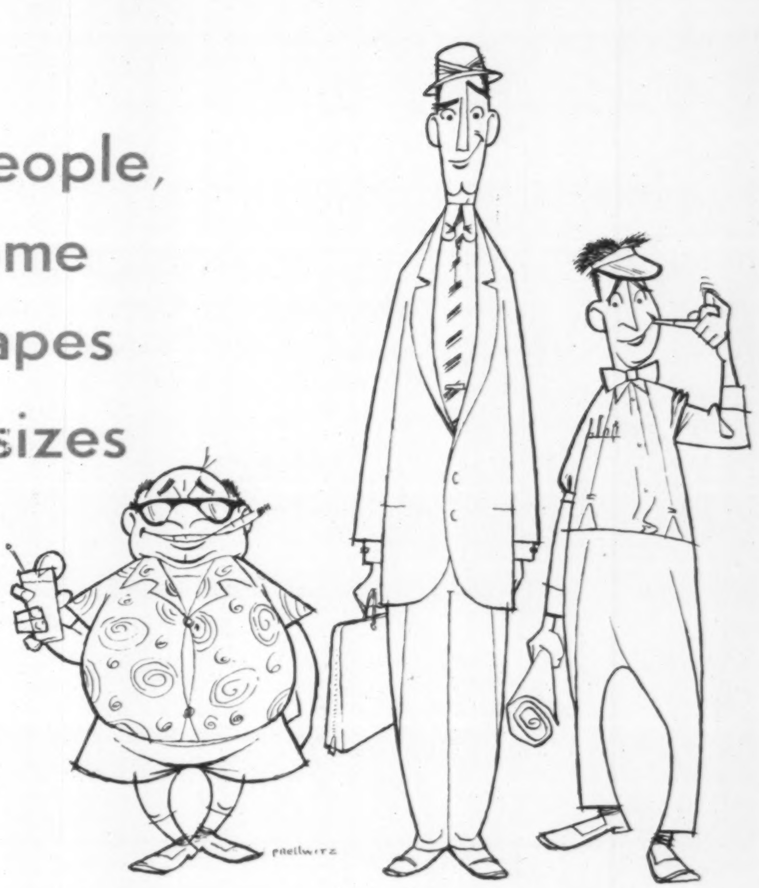
Nesbitt

HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

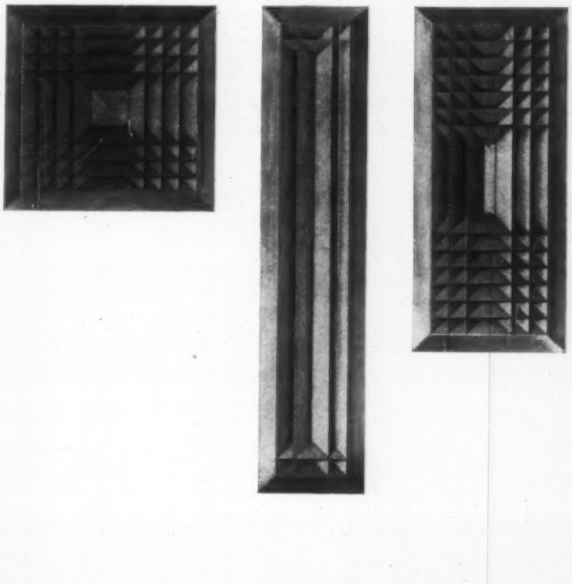
JOHN J. NESBITT, INC., Main Office and Factory: Philadelphia 36, Pa. Telephone DEvonshire 2-2400

AP-158

Just like people, we come in all shapes and sizes



ADP



ADP diffusers come in squares, rectangles and continuous units. Sizes and types to meet any requirement. Available with removable core and supply and return air combinations. Engineered for better air distribution.

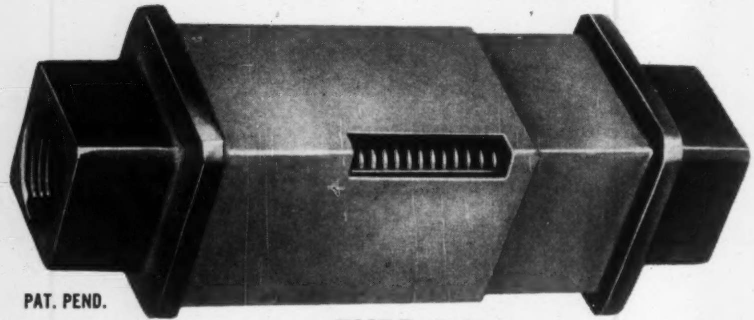
AIR DIFFUSION PLUS

AIR DISTRIBUTIONS PRODUCTS

116 South La Brea Avenue **Los Angeles 36, California**

KEFLEX QUADRA-SIDE
Telescopic Expansion Compensators

WITH LAMINATED STAINLESS STEEL BELLOWS, 2 PLY OR MORE
SOMETHING NEW FOR THE
OWNER — ARCHITECT — ENGINEER — CONTRACTOR



PAT. PEND.

TYPE 7Q

SIZES ¾"-3" Inc.

Working Pressure 300 P.S.I. — Temperature to 800°F. — Has Reserve Strength — Not Just Borderline Prospect of Withstanding Effect of Pressure — Shock — Thermal Line Expansion — High Temperature — Moderate Vibration. HIDDEN PROTECTION PLUS! All Non Corrosive Stainless Steel Bellows With Brass or Bronze End Fittings and Telescopic Shrouds.

ROUND

KEFLEX Bellows are made of Laminated Stainless Steel, multiple ply (usually 2 ply or more) for greater strength with minimum force required to move bellows. The minimum force to move 7 Q Keflex Bellows greatly reduces the need for additional anchoring above that required to handle line pressure thrust force as the force to move Keflex 7 Q only is always less than 100 lbs.

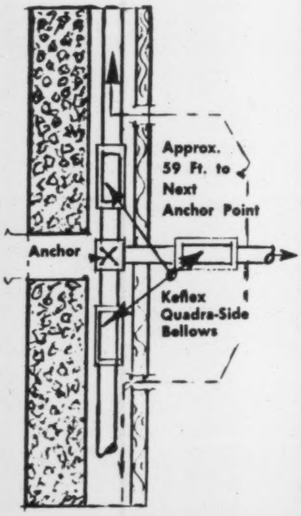
FLAT

KEFLEX FLAT GUIDES offer so many advantages it is difficult to mention them all. Briefly: The KEFLEX FLAT OUTSIDE GUIDE (shroud) is made of brass USUALLY formed square of required length — one unit end will telescope over other unit end. The flat surfaces slide over and in one another — practically eliminating possibility of torque as result of faulty installation. This ASSISTS PROPER GUIDING.

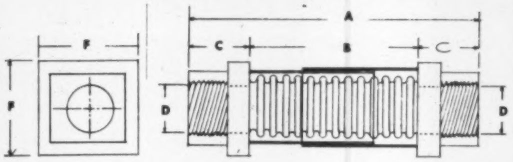
SQUARE

KEFLEX SQUARE END FITTINGS are made of heavy, non-porous, square, bronze stock, and threaded tapered female pipe size. They are attached to the KEFLEX 7 Q bellows and the outside guides by silver brazing. The result is an easy moving expansion joint that will absorb either the slightest or the greatest thermal pipe expansion and with practically no load on the anchors. The heavy bronze ends, which will not crush during normal installations, assures safe and leakproof joints.

KEFLEX FITS IN NARROWEST WALL SPACE—SAFE—PERMANENT


Approx. 59 Ft. to Next Anchor Point
Anchor
Keflex Quadra-Side Bellows

KEFLEX DATA

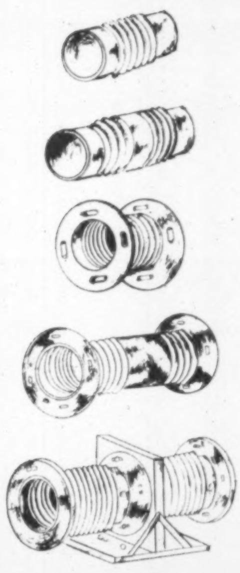


AXIAL TRAVEL

For: ¾" For: 1.50"

D Nom. I.P.S.	A Overall Length	A Overall Length	B Live Length	C Coup. Len.	F Max. O.D.
¾-1.00-1.25"	4.50"	6.50"	4.00"	1.25"	2.00"
1.50"	4.50	6.50	4.00	1.25	2.50
2.00	4.50	6.50	4.00	1.25	3.00
2.50	4.50	6.50	4.00	1.25	3.50
3.00	4.50	6.50	4.00	1.25	4.00

KEFLEX®
Write for Trade Literature



U. S. FLEXIBLE METALLIC TUBING CO.

SINCE 1905

KEFLEX MANUFACTURING DIVISION • 454 EAST THIRD STREET, LOS ANGELES 13, CALIFORNIA

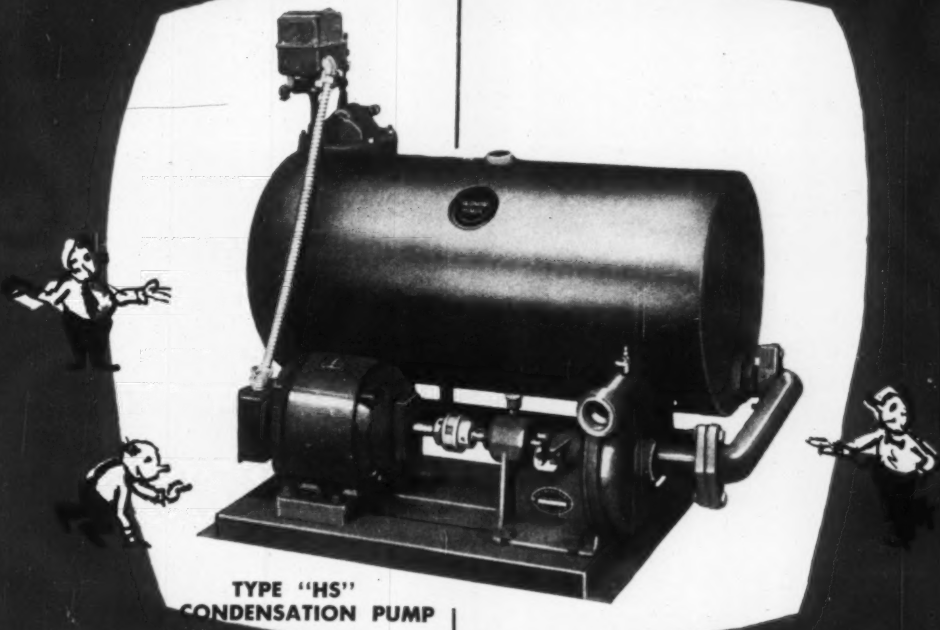
SAN FRANCISCO 5
63 Main St

PORTLAND 9, OREGON
328 N.W. Broadway

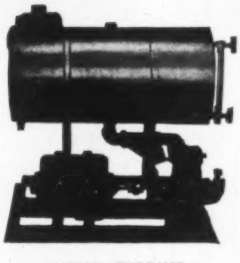
SEATTLE 4, WASHINGTON
2425—6th Ave. S.

Skidmore

DOUBLE "E"
. . . sets the pace
in pump performance



**TYPE "HS"
CONDENSATION PUMP**



"TM" TURBINE

"UV" TYPE

Economy minded Architects, Engineers and Contractors specify the Skidmore "HS" Pump—they know its "time proven" performance in handling condensate.

The Skidmore "HS" Pump is equipped with bronze fittings throughout—including bronze fitted impeller and stainless steel shaft to insure long-life and proper alignment.

Yes, the popular "HS" Condensate Pump possesses all the fine features that are found in every Skidmore Pump: Expert engineering, ruggedness, dependability, plus, economy and efficiency.

Write for Bulletin No. 14-A . . . and send us your pump problem today!

VACUUM TYPE

MAINTAINED SKIDMORE PUMPS EFFICIENCY

* ECONOMY
EFFICIENCY

***SEND FOR
BULLETINS***

SKIDMORE
PUMPS

**SKIDMORE
CORPORATION
ST. JOSEPH, MICH.**

ACCO
for Better Values

R-P&C Valves

DESIGNED FOR DEPENDABILITY

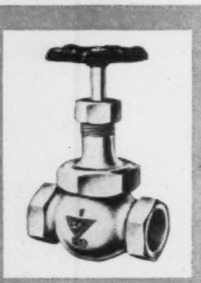


Fig. 1-A, rated for 150 lbs., has special asbestos composition disc for tight shutoff

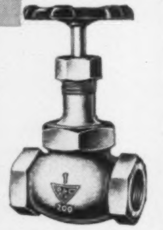


Fig. 409, rated for 200 lbs., has integral high test bronze seat for easy regrinding

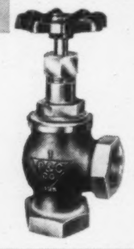


Fig 033 Angle Valve, rated for 125 lbs., has integral seat, re-grinding type disc

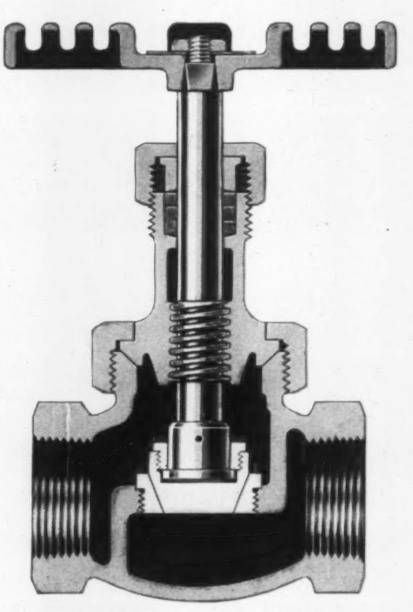


Fig. 427-DP Bronze Globe Valve

R-P&C Distributors offer 9 different models of Bronze Globe Valves—What are your requirements?

• You can select the R-P&C globe or angle valve to meet your particular requirements from a wide variety of seat and disc constructions, with union or screwed bonnet, screwed ends, in pressure classes from 125 to 300 pounds. Your R-P&C distributor offers 9 different bronze globe valves, each in a complete range of sizes—and 8 different models of angle valves which duplicate the construction features found in the globe valve line.

For example, if your application calls for frequent or continuous throttling in steam, water, oil or gas service, the **Fig. 427-DP** shown above is probably your best bet. The full plug construction gives you closer regulation. And the 500 Brinell stainless steel seat and disc resist wire drawing—give you much longer valve life.

Your R-P&C distributor can recommend the specific valve to answer your particular problem. And he has an equally wide selection in R-P&C's complete line of angle, gate and check valves in iron and cast steel, as well as forged steel gate valves. See him today.

Send for this free wall chart
"How to Protect Your Valves"

• 22 in. x 17 in. wall chart tells how to protect valves, get longer valve life—gives installation and operation pointers. Write for your copy.

R-P&C Valve Division
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,
Houston, New York, Philadelphia, Pittsburgh, San Francisco,
Bridgeport, Conn.

ACCO
TRADE MARK

ON TEXAS TOWERS

Wallace Process Piping Co., Inc.

Used

MIDWEST

WELDING FITTINGS

Among the unique installations for preservation of peace are the early warning radar "Texas Towers" off the Atlantic Coast. These artificial islands stilted to the ocean floor keep watch by radar. As is true of many defense projects, Midwest Welding Fittings played a significant part on Texas Towers.

Midwest Welding Fittings are found on unusual and in critical as well as routine jobs because of exceptional quality maintained by rigid standards of manufacture. Quality control is always above and beyond code requirements.

Whatever the piping job, you will find it to your advantage to use Midwest Welding Fittings. The many benefits you get by specifying "Midwest" are shown in Catalog 54. Ask your distributor or write us for a copy.

MIDWEST PIPING COMPANY, INC.

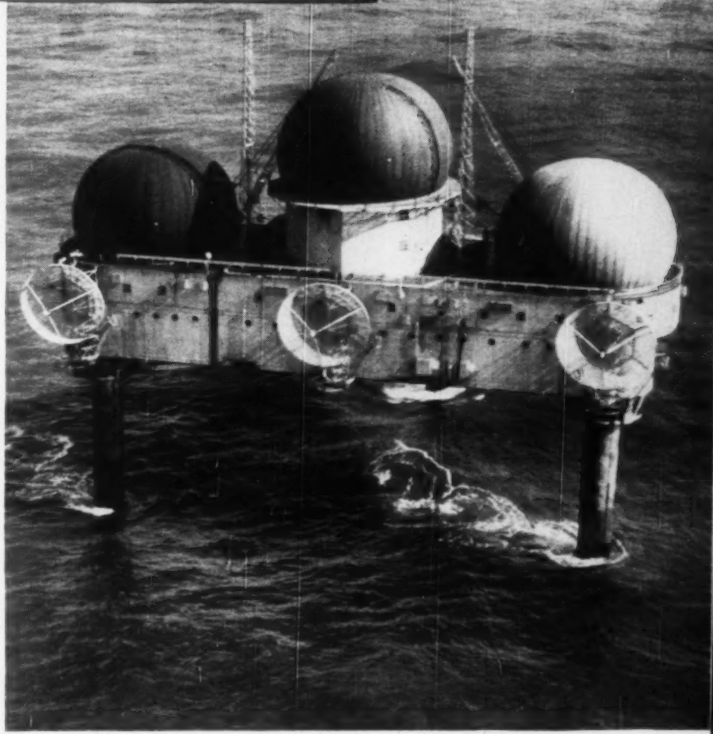
Main Office: St. Louis 3, Missouri (P.O. Box 433)

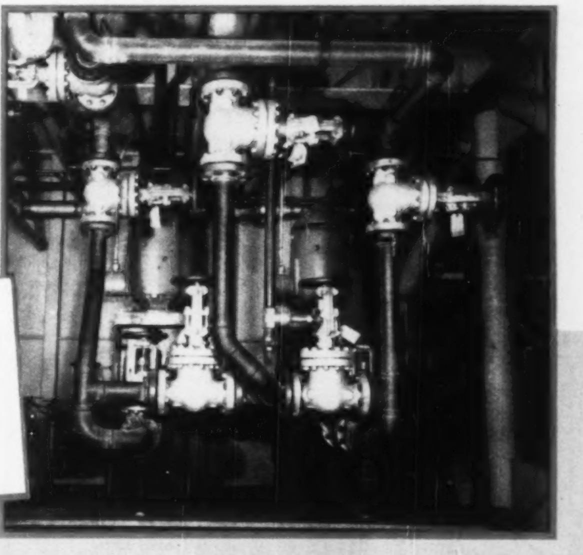
PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

SALES OFFICES:

ASHEVILLE (BOX 446, SKYLAND, N. C.) • BOSTON 27—426 FIRST ST.
CHICAGO 3—79 WEST MONROE ST. • CLEVELAND 14—616 ST. CLAIR AVE.
HOUSTON 2—1213 CAPITOL AVE. • LOS ANGELES 33—520 ANDERSON ST.
MIAMI 34—2103 LE JEUNE RD. • NEW YORK 7—50 CHURCH ST.
ONEIDA, N.Y.—282 NORTH MAIN ST. • PITTSBURGH 19, PA.—437 GRANT ST.
ST. LOUIS 4—1450 S. SECOND ST. • SAN FRANCISCO 11—420 MARKET ST.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

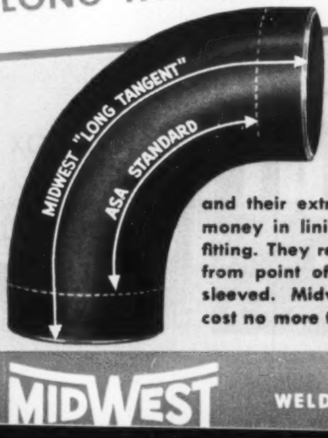




MONEY SAVED With

MIDWEST

"LONG TANGENT" ELBOWS



Here are the important advantages of Midwest "Long Tangents": They save pipe. They often eliminate short nipples and their extra welds. They save time and money in lining up and clamping pipe and fitting. They remove the circumferential weld from point of maximum stress and can be sleeved. Midwest "Long Tangent" Elbows cost no more than other elbows.

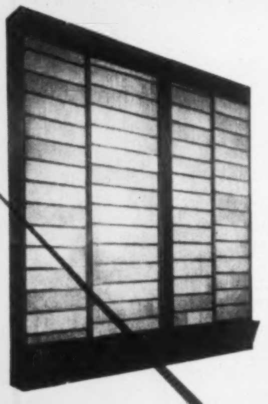
Piping on two Texas Towers was installed by Wallace Process Piping Co., Inc., as subcontractors to Steers Morrison Knudsen and Continental Copper & Steel Industries, Inc. All welding fittings were supplied by Midwest through Central Jersey Supply Co. The many advantages of Midwest "Long Tangent" Elbows were an important factor in the selection of Midwest fittings for this critical work.

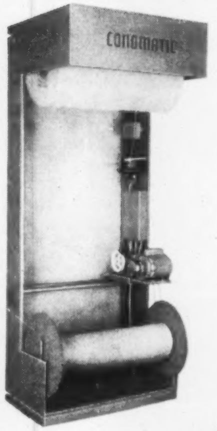
7901

MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS

'round the world...

CONTINENTAL *clears the air*





CONOMATIC
ROLL-AWAY TYPE

Automatically controlled, clears air at lowest cost per cubic foot of any filter in its classification. Dependable automatic performance with minimum of maintenance attention.

Ask for catalog #802

E-Z Oil
Air Filter Oil

E-Z-OIL AEROSOL BOMB

For simple finger-tip reoiling of viscous-type unit filters after washing.

SELF-CLEANING AUTOMATICS

Patented media design and unique "soak-then-flush" action provide thorough self-cleaning. Ferris-wheel feature eliminates reversing media to direction of air flow in back curtain—no dust can be blown back into clean air stream.

Ask for catalog #210

HEAVY DUTY ENGINE AIR INTAKES

All advantages of Continental's Self-Cleaning Automatics assure maximum protection with minimum maintenance cost and effort.

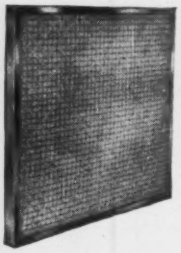
Ask for catalog #100

AIR
CONTINENTAL
FILTERS

E-Z-WASH UNIT FILTERS

Continental's patented media assures high efficiency, easy washing, freedom from clogging, and exceptional dust-holding capacity.

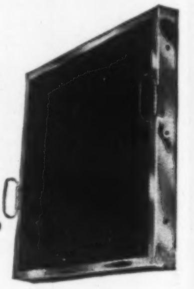
Ask for catalog #423



TYPE DY DYCON

Permanent 1" synthetic fiber filter in rust-proof aluminum frame easily rinses clean under open water faucet or nozzleless hose. Exceptional dust-holding capacity means infrequent servicing. Made in any desired size.

Ask for catalog #570



E-Z-WASH GREASE FILTERS

All aluminum highly efficient, permanent-type filters for kitchen exhaust systems. Easily washed—once through an automatic dishwasher and they are like new again.

Ask for catalog #700

DYCON
CA-20, CA-24

Oil-free, synthetic media of these extended-surface unit filters effectively traps and holds dust by accumulated static charge. Large dust-holding capacity. Choice of various media blankets to provide degree of efficiency desired. Easily rinsed for re-use — cuts maintenance costs.

Ask for catalog #450

TYPE LV SCREEN WIRE

Graduated mesh-size in this formed screen wire filter add efficiency and dust-holding capacity. Viscous impingement, low velocity type Available in 2- or 4-inch thickness, all standard sizes. Special sizes on order.

Ask for catalog #600

REFER to catalog in Sweet's Architectural File, or CONTACT the Continental Sales representative in your city, or WRITE direct for catalogs, estimates, other information

CONTINENTAL
AIR FILTERS, Inc.

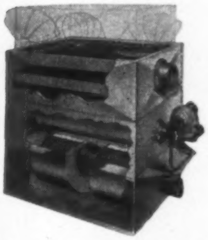
P. O. BOX 1647
•
LOUISVILLE 1
KENTUCKY

Campbell

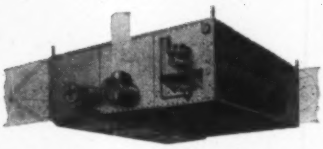
WARM AIR HEATERS FOR LARGE BUILDINGS

Campbell Heaters make it easy to use warm air heating in large buildings. Easy to install, compact, dependable and low in cost.

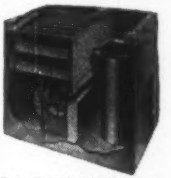
Our Engineering Department is at your service. Send us your preliminary plans and ideas and we will be glad to help you work them out.



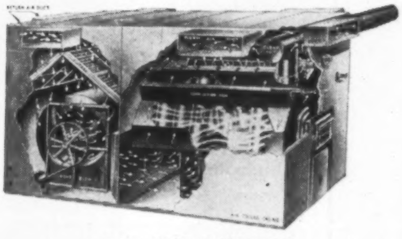
HI-BOY UNIT HEATER



HORIZONTAL UNIT HEATER



LO-BOY HEATER



8000 SERIES HEATER

SPECIFICATIONS and DIMENSIONS

HEATER					BLOWER‡		MAX. FUEL RATE§				DIMENSIONS		
Unit No. *	Output Capacity BTU/Hr. †	Heating Surface Sq Ft	Btu per Sq Ft Heating Surface	Normal cfm 140° Dischg. Temp.	Assumed External Static In. Water	Motor hp	Oil gph	1000 Btu Gas cfh	LP Gas gph	Coal Lbs Per Hr.	H in.	L in.	W in.
Hi Boy & Horizontal Unit Heater—Oil & Gas for Churches, Schools, Commercial & Industrial Buildings													
U225	225,000	84	2700	2750	½	½	2.0	280	2.8		66	48	23
U275	275,000	84	3300	3350	½	¾	2.5	350	3.5		66	48	23
U325	325,000	121	2700	4000	½	¾	2.9	400	4.0		72	54	29
U400	400,000	121	3300	4900	½	1	3.6	500	5.0		72	54	29
U500	500,000	182	2750	6100	½	1	4.5	625	6.3		84	60	34
U600	600,000	182	3300	7300	½	1½	5.4	750	7.5		84	60	34
U700	700,000	244	2850	8500	½	2	6.2	875	8.8		99	78	40
U800	800,000	244	3300	9800	½	2	7.2	1000	10.0		99	78	40
U950	950,000	334	2850	11,600	½	3	8.5	1200	12.0		108	96	48
U1100	1,100,000	334	3300	13,500	½	3	9.8	1375	13.8		108	96	48
U1300	1,300,000	455	2850	16,000	½	3	11.6	1625	16.3		126	114	54
U1500	1,500,000	455	3300	18,500	½	5	13.4	1875	18.8		126	114	54
Lo Boy Oil & Gas Fired for Large Residences, Small Churches, Schools, etc.													
H200	235,000	100	2350	2600	½	½	2.1	293	2.9		52	75	41
H250	275,000	125	2200	3300	½	¾	2.5	344	3.4		57	85	41
H300	340,000	136	2500	4000	½	¾	3.0	425	4.2		61	87	50
H350	400,000	152	2600	4600	½	1		500	5.0		61	87	50
H400	450,000	167	2700	5300	½	1½	4.0	560	5.6		61	87	50
H500	500,000	200	2750	6600	½	1½	4.5	625	6.2		74	91	60
H600	650,000	240	2700	8000	½	2	5.8	810	8.1		76	97	60
H700	750,000	280	2700	9200	½	2	6.7	940	9.4		72	104	80
8000 Series Oil, Gas, Stoker or Hand Fired For Large Schools, Churches, etc.													
8075	840,000	280	3000	11,000	¾	3	7.5	1050	10.5	100	93	134	76
8100	960,000	320	3000	12,500	¾	3	8.6	1200	12.0	114	95	153	76
8125	1,080,000	360	3000	14,100	¾	3	9.7	1350	13.5	129	97	171	76
8150	1,320,000	440	3000	17,300	¾	5	11.8	1650	16.5	157	98	195	76
8175	1,440,000	480	3000	18,900	¾	5	12.9	1800	18.0	171	99	202	76
8200	1,800,000	600	3000	23,600	¾	5	16.1	2250	22.5	214	120	216	94
8250	2,250,000	750	3000	29,500	¾	7½	20.1	2810	28.0	268	120	243	94
8300	2,700,000	900	3000	35,400	¾	7½	24.1	3380	33.8	320	132	251	104
8350	3,150,000	1050	3000	41,300	¾	10	26.1	3940	39.4	375	150	251	114

† Based on 80% thermal efficiency for oil and gas and 70% for coal. Add 10% to 35% over calculated heat loss for pick-up load and 10% to 15% for duct radiation losses. The higher figure is preferable for best operating economy and life of the equipment.

‡ For other air volumes and static pressures consult our Engineering Department.

§ An induced draft blower can be furnished if a stack or chimney is not available. The gas passages of the heaters are adequate so an induced draft blower is not ordinarily needed.

For Complete Specifications, See *Sweet's Catalog Service*

CAMPBELL HEATING COMPANY

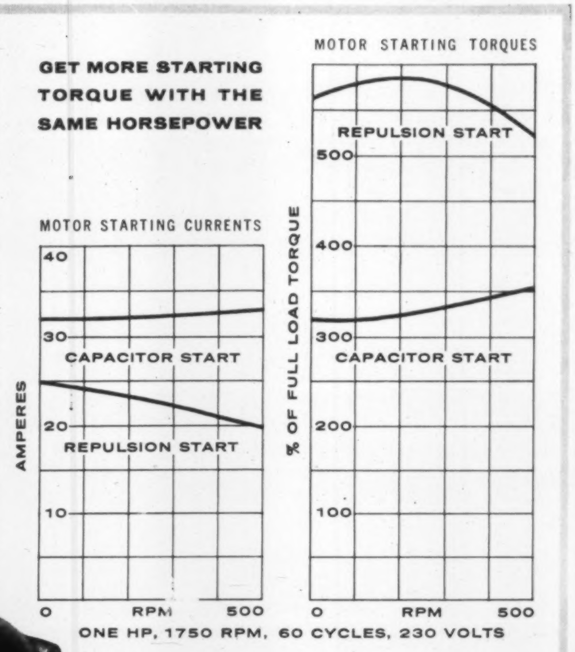
Des Moines 17, Iowa

WAGNER SINGLEPHASE MOTORS

This two-in-one motor is your best choice

FOR HARD-TO-START LOADS

GET MORE STARTING TORQUE WITH THE SAME HORSEPOWER



The Wagner Heavy Duty Type RA Repulsion-Start Induction Motor offers:

- ***HIGH STARTING TORQUE***
- ***LOW STARTING CURRENT***
- ***HIGH OPERATING SPEED***
- ***FLAT EFFICIENCY CURVE***

The Wagner Type RA is the work horse of the singlephase motor field. It combines high starting torque for quick, easy starts with low starting current and minimum light flicker. It has a constant high operating speed, even under overload, and a flat efficiency curve over a wide operating range.

You practically eliminate service problems when you power tough singlephase applications with Wagner RA Motors. They have unmatched ability to start high inertia or heavy friction loads repeatedly and they give many years of unfailing service.

Let a Wagner Sales Engineer show you how these motors can be applied to your needs. Call the nearest branch office, or write for Bulletin MU-220.

H. P.	OLD FRAME SIZE	PRESENT FRAME SIZE
1	203	182
1½	204	184
2	224	213
3	225	215
5	254	254U

Integral ratings, 1-5 hp are available in the latest NEMA Frame Sizes

4 pole (1750 RPM, 60 cycle and 1450 RPM, 50 cycle) ratings are interchangeable in mounting dimensions with capacitor start motors of the same ratings.

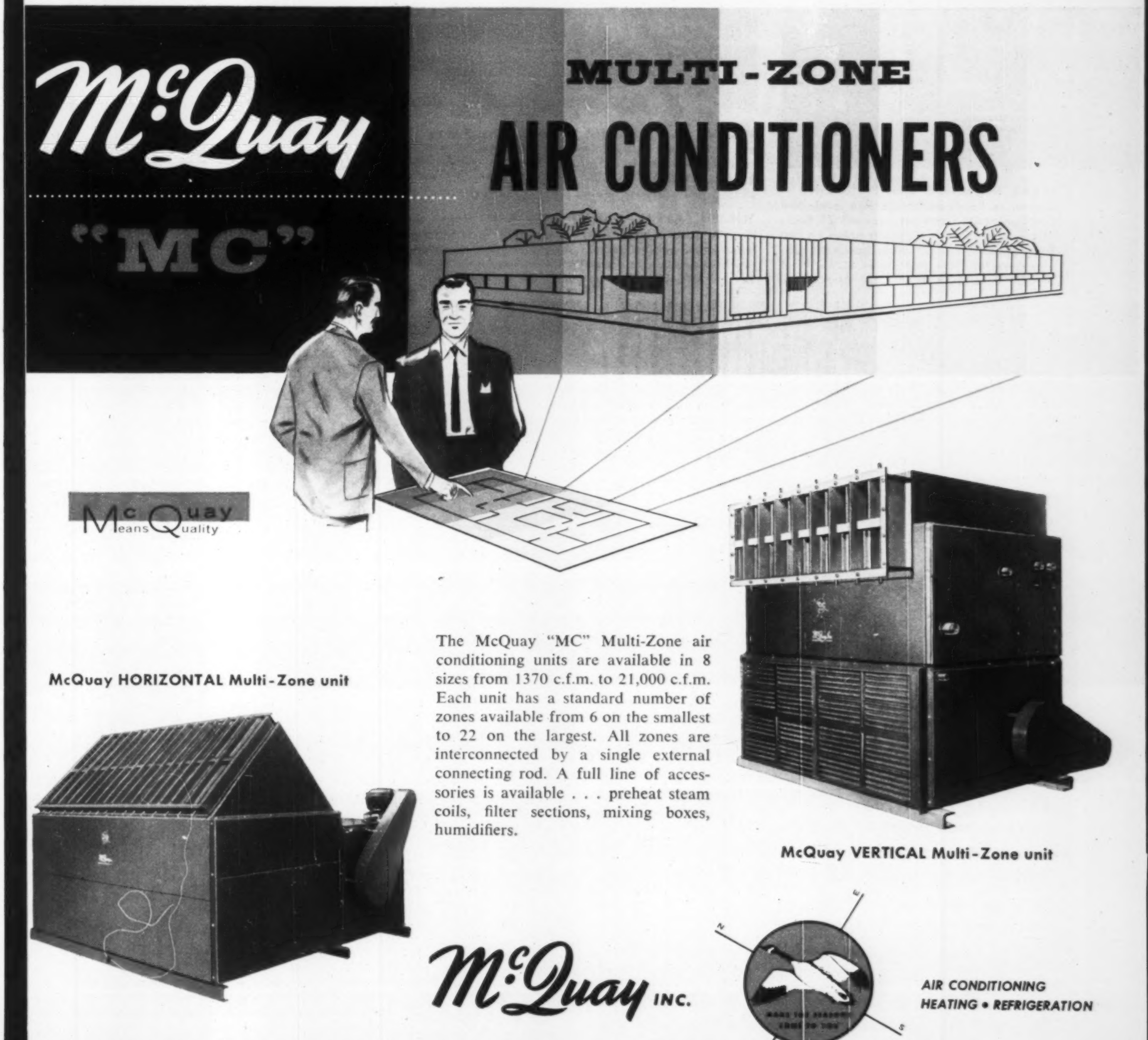
Wagner
Electric Corporation
SERVING INDUSTRY SINCE 1891

WM58-2

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Wagner Electric Corporation
6370 Plymouth Ave., St. Louis 14, Mo., U. S. A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC



you can

HEAT & COOL

SIMULTANEOUSLY

with these

Outside weather conditions, or inside requirements may make it necessary to heat some sections of a building at the same time that other sections require cooling. Where these conditions exist, the McQuay "MC" MULTI-ZONE air conditioning unit will furnish balanced comfort *simultaneously* to different determined areas with either filtered, *cooled* and dehumidified air, or filtered, *heated* and humidified air . . . or a mixture of these in any desired proportions . . . at your command.

If *you* have this problem, contact the nearest McQuay representative for consultation, complete engineering data and costs . . . When it's McQuay, you can be sure that engineering research and know-how have produced the finest, most efficient and dependable equipment available . . . and, only McQuay makes the famous Ripple-Fin coils. McQuay, Inc., 1601 Broadway St. N.E., Minneapolis 13, Minn. Representatives in all principal cities.

McQuay "MC"

MULTI-ZONE AIR CONDITIONERS

McQuay Means Quality

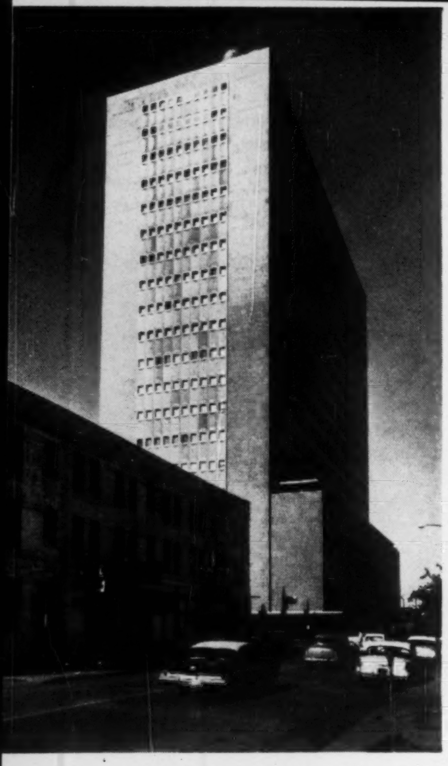
McQuay HORIZONTAL Multi-Zone unit

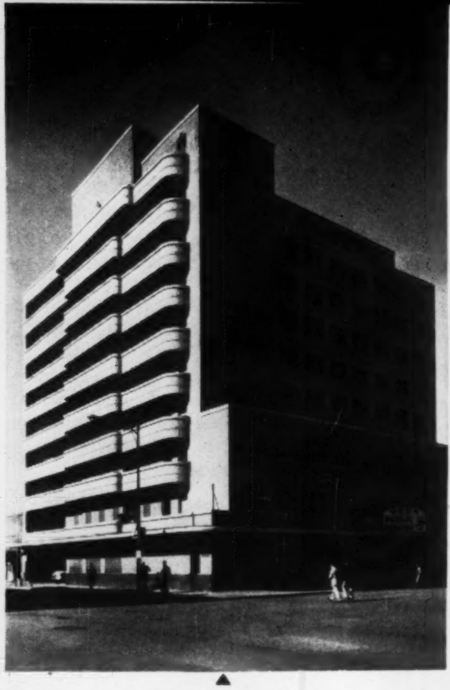
The McQuay "MC" Multi-Zone air conditioning units are available in 8 sizes from 1370 c.f.m. to 21,000 c.f.m. Each unit has a standard number of zones available from 6 on the smallest to 22 on the largest. All zones are interconnected by a single external connecting rod. A full line of accessories is available . . . preheat steam coils, filter sections, mixing boxes, humidifiers.

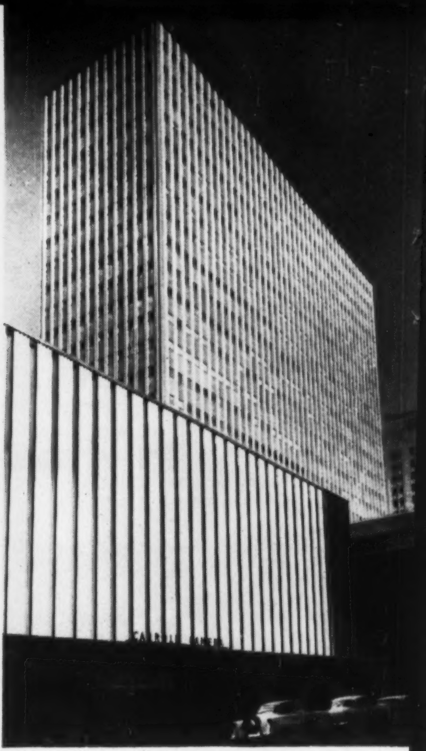
McQuay VERTICAL Multi-Zone unit

McQuay INC.

AIR CONDITIONING
HEATING • REFRIGERATION







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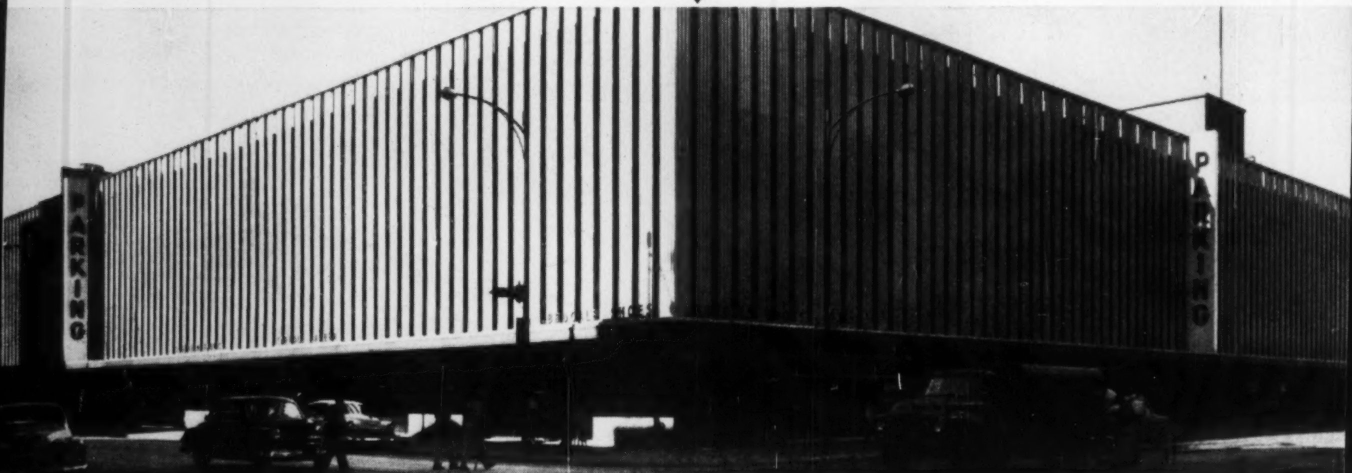
MEDICAL ARTS PARKING GARAGE—This 9-story, 320 car facility has horizontal-vertical elevators which deliver cars automatically in 75 seconds. Sprinkler system protects basement, contains 1,677 ft. of 1" to 5" SPANG Steel Pipe serving 171 sprinkler heads.

TEXAS NATIONAL BANK BUILDING—Serves as headquarters for the bank and Continental Oil Company, contains 21 floors of office space, has shopping areas on first floor. Sprinkler system serves basement, sub-basement and first floor; uses 5,242 ft. of SPANG Pipe feeding 801 sprinkler heads.

TEN-TEN PARKING GARAGE—The south's largest public parking facility has 1500-car capacity, is of ramp-type construction with heliport on the roof. Sprinkler system for sub-basement, basement and first floor shops contains 18,911 ft. of SPANG Steel Pipe feeding 1,507 sprinkler heads.

▼

BANK OF THE SOUTHWEST BUILDING—Houston's newest and largest office building is 24 stories high, contains the largest single banking room in the nation. Sprinkler system for basement, sub-basement and first floor uses 17,000 ft. of SPANG Pipe, has 1,111 sprinkler heads.



FIRE PROTECTION WITH SPANG® STEEL PIPE

Down Texas way, sprinkler systems must pass the rigid requirements of the Texas Fire Commission. Commission inspectors test the system at 200-pound hydrostatic pressure for two hours. Each system must provide 15 psi residual pressure for 25 gpm water delivery at the top line sprinkler.

Naturally, the Spang Steel Pipe sprinkler systems, installed in these four new Houston buildings, passed these tests and more than met the National Board of Fire Underwriter requirements . . . because Spang Pipe is manufactured under strict *quality-control* conditions, is inspected and tested before shipping to assure a *top-quality* product.

In every type installation, Spang Steel Pipe will give you *top-quality* performance. Try it and see for yourself. For *top-quality* service, contact your local Spang Distributor.

SPANG®
CW STEEL PIPE

SPANG-CHALFANT
DIVISION OF THE NATIONAL SUPPLY COMPANY
General Sales Offices: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

From the World Leader in Warm Air Heating...

LENNOX

industrial heaters

For Space Heating, Drying, Make-Up Air, Oven Applications • 400,000 to 2,000,000 Btuh

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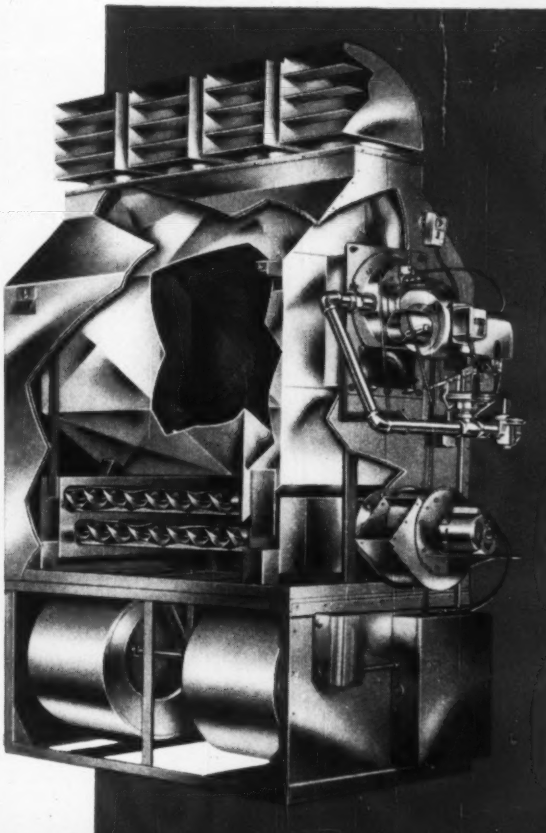
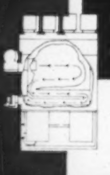
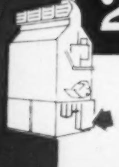




1 4-PASS COUNTER FLOW DESIGN...

Gets Most Heat from the Flame!

See how flame and combustion gases travel length of the heat exchanger *four times*. Result: highest possible efficiency! With this principle, no directional baffles are needed; *design* does the job. An important, trouble-free LENNOX exclusive!



2 MASTER CONTROL SYSTEM...

Factory Wired! Trouble Free!

Control based on newest-type lead sulfide scanning device—for Greater Safety, Longer Life! One master control provides all sequencing, eliminates nonstandard controls. Automatic protection for any failure. No cold-surge at startup; blowers operate only at proper bonnet temperature.

3 STAINLESS STEEL COMBUSTION CHAMBER...

With 10-Year Warranty!

Rugged steel construction and free-floating design eliminate failures due to unrelieved stress. Operating temperature utilizes only 70% of steel's oxidizing temperature. *Maximum flame radiation* with 80% of total heat output transmitted in primary area.

4 DOUBLE CASING; METAL RADIATION SHIELD...

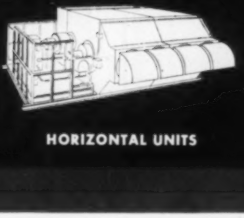
Another LENNOX Exclusive!

This added protection holds casing heat loss to absolute minimum. Special air-tight locking seams eliminate cabinet air leaks. The outer cabinet is further protected by enamel coat that resists heat and corrosion. One more reason why a LENNOX heater lasts longer!

Mail Coupon FOR COMPLETE ENGINEERING DATA!

ADAPTABLE TO MANY APPLICATIONS

FLOOR UNITS



HORIZONTAL UNITS

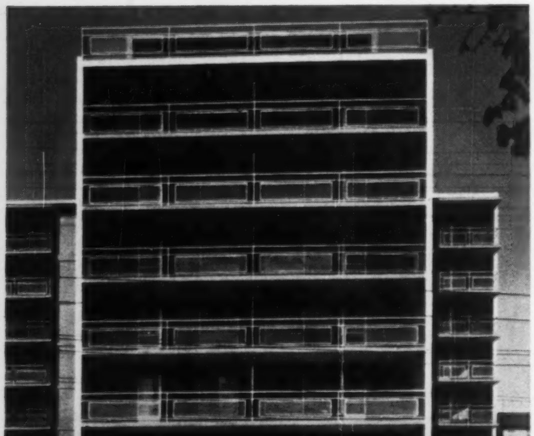
INVERTED UNITS

LENNOX INDUSTRIES, INC.
INDUSTRIAL DIVISION, Dept. HP-1
1701 East Euclid, Des Moines, Iowa
Please rush me complete data on Lennox AT Series Industrial Heaters.

Name________________________
Title____________Company____________
Address________________________
City____________State____________

Ford Assembly Plant, Milpitas, Calif., has Beth-Co-Weld pipe in sprinkler installation. *Sprinkler Contractor:* California Viking Sprinkler Co.

New west coast buildings
with Beth-Co-Weld steel pipe



Skyline House, Seattle, Wash., uses Beth-Co-Weld for general-purpose piping. *Mechanical Contractor:* The Ballard Company. *Pipe Jobber:* Grinnell Company of the Pacific.

Each of these two new buildings has one thing in common—thousands of feet of Beth-Co-Weld steel pipe.

In the automobile assembly plant at Milpitas, Calif., Beth-Co-Weld is used in the sprinkler system; at Skyline House, an 85-unit luxury apartment building, Seattle, Wash., it is used as general-purpose piping.

Beth-Co-Weld is ideal pipe for sprinkler installations and for general-purpose piping because it's so strong and sound. Moreover, it's economical pipe in the shop, and on the job, because it's so easy to cut, thread and weld.

Beth-Co-Weld is furnished black and galvanized, standard weight and extra-strong, in sizes from ½ in. through 4 in. It comes in 21-ft lengths, plus or minus 1 in., as well as in random and cut lengths. Be sure to specify Beth-Co-Weld on your next order for steel pipe.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

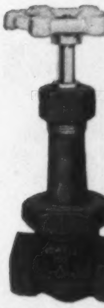


Fig. 375—Bronze Gate Valve for 200 pounds W.S.P. Union bonnet, inside screw rising stem.

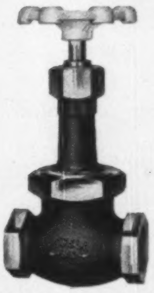


Fig. 2608—Bronze "WS" Full Flow Globe Valve for 200 pounds W.P. Fuller flow, less turbulence and pressure drop.

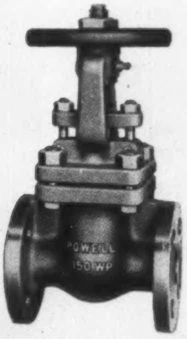


Fig. 2491—Stainless Steel Gate Valve for 150 W.P. Outside screw rising stem and yoke. Interchangeable solid or split wedge discs.

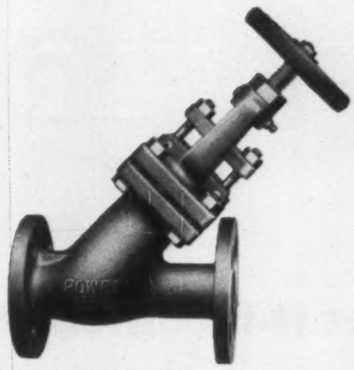


Fig. 2107—Stainless Steel "Y" Valve for 150 W.P. Plug type disc. Face to face and end flange dimensions conform to latest standards.

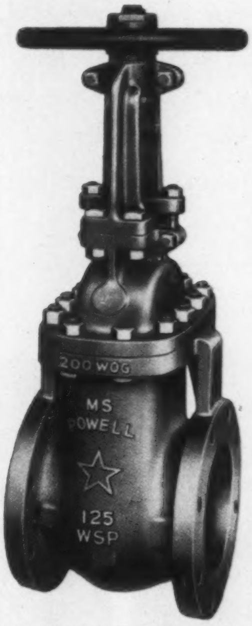


Fig. 1793—Iron Body Bronze Mounted Gate Valve for 125 pounds W.S.P. Outside screw rising stem and yoke.

Bronze, Iron, Steel and alloy Valves

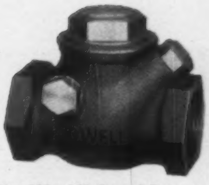


Fig. 560—200-Pound Bronze Regrinding Swing Check Valve. "Y" type, ¼" to 1"; regular type (above), 1¼" to 3".

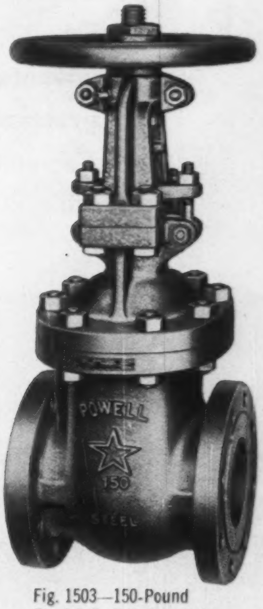


Fig. 1503—150-Pound Steel O.S. & Y. Gate Valve.

POWELL...

world's largest family of valves

FOR EVERY FLOW CONTROL PROBLEM Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Your local valve distributor will be glad to tell you all about them. Or write to us for the full facts.

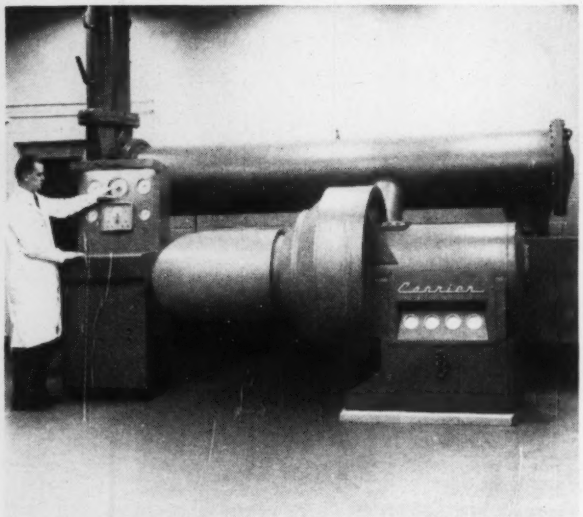
THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

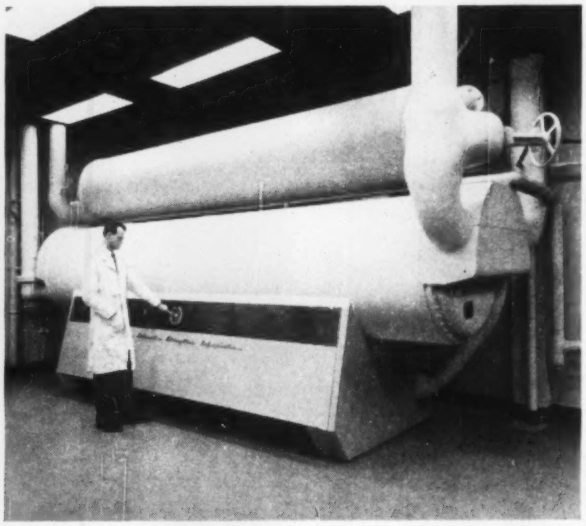
BETTER AIR CONDITIONING FOR EVERYBODY EVERYWHERE

Carrier

Which way is best to air condition a building?

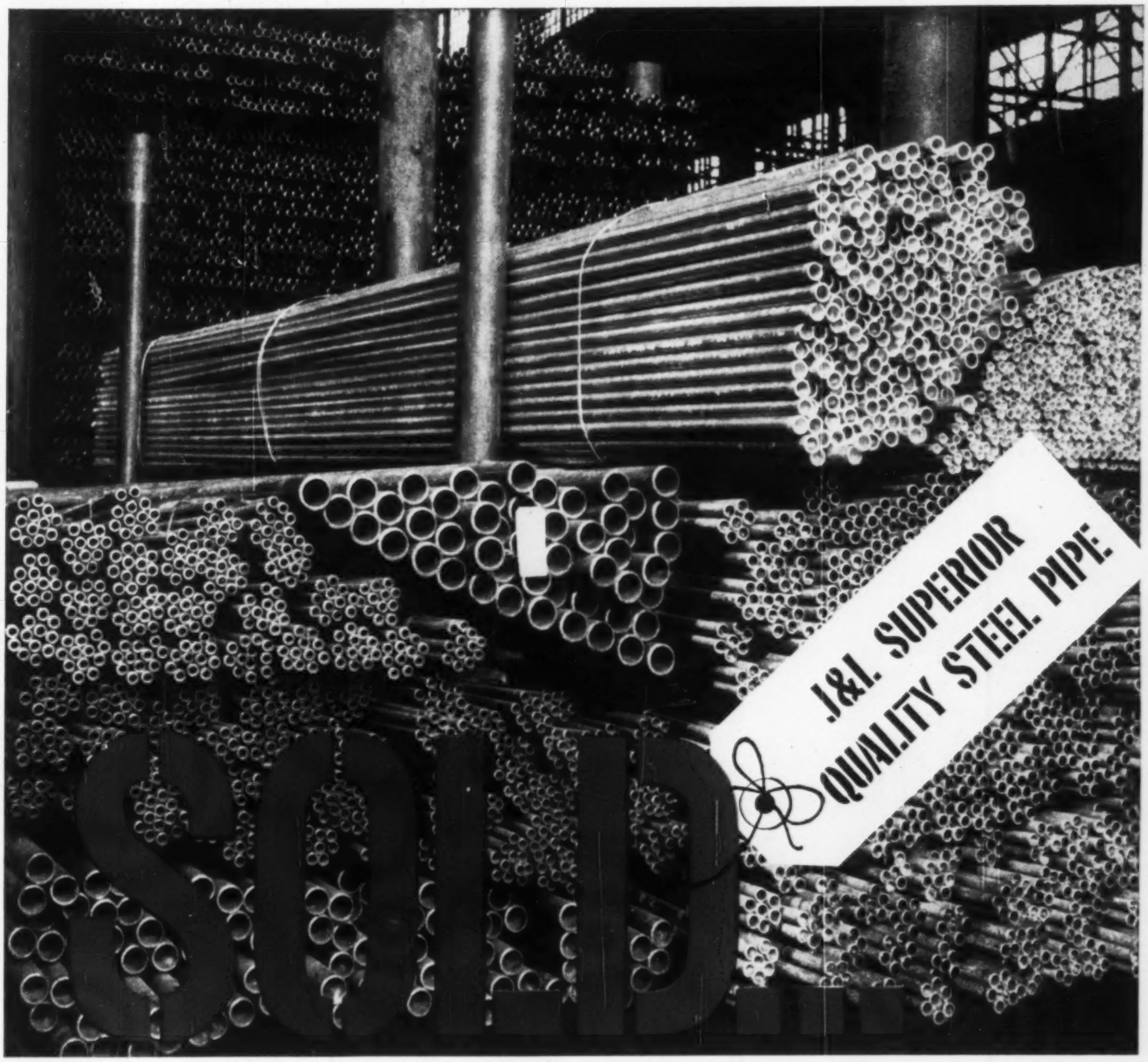
Every building poses different problems. Take the refrigerating machine, for example. Where should it be located? What kind of power is available? How much tonnage do you need? Carrier builds every type of refrigeration for air conditioning. Two of the many types are shown below. Each provides unique advantages under special conditions. Each has been proved practical and dependable in installation after installation. For complete information about them, call your nearest Carrier office. Or write Carrier Corporation, Syracuse, New York.





If you have low-cost electric power, the new Carrier Hermetic Centrifugal Refrigerating Machine offers unmatched advantages. It's the only hermetic with such advanced features as refrigerant-cooled motors through the entire capacity range, hydraulic powered capacity vanes, and electronic controls for completely automatic operation. Its compact design and light weight minimize space and structural requirements. In 28 sizes—90 to 1100 tons. Other Carrier Centrifugals up to 4000 tons. For smaller buildings, there are "packaged" Carrier Reciprocating Water Cooling Machines from 3 to 200 tons.

If you have low-cost steam, the best way may be a new Carrier Absorption Refrigerating Machine. It cools with heat energy derived from low-pressure waste steam or hot liquids to cut costs. Operates automatically at the push of a button. Follows fluctuating loads electronically from full load to zero capacity. It's safe — with water the refrigerant, a simple salt the absorbent. And it's so compact and vibration-free you can locate it wherever there's room to spare — on the roof, in the basement or anywhere in between. In thirteen sizes with cooling capacities ranging from 60 to 700 tons.



ACROSS THE NATION BY OVER 400 DISTRIBUTORS

It pays to specify Jones & Laughlin steel pipe for two reasons:

1. You get superior quality pipe. Jones & Laughlin is an integrated steel company. This permits rigid quality control from raw materials through the finishing mills. You can be sure of long-lasting, trouble-free installations with J&L steel pipe.

2. You are sure of a dependable source of supply. J&L pipe is sold by over 400 leading distributors across the nation. They carry complete stocks for prompt service. And they are prepared to furnish technical service by steel pipe specialists.

Whenever you need superior pipe and dependable service, call your nearest J&L distributor or write direct to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

RX *MIXED-FLOW BLOWER UNIT: A TORRINGTON 1st*

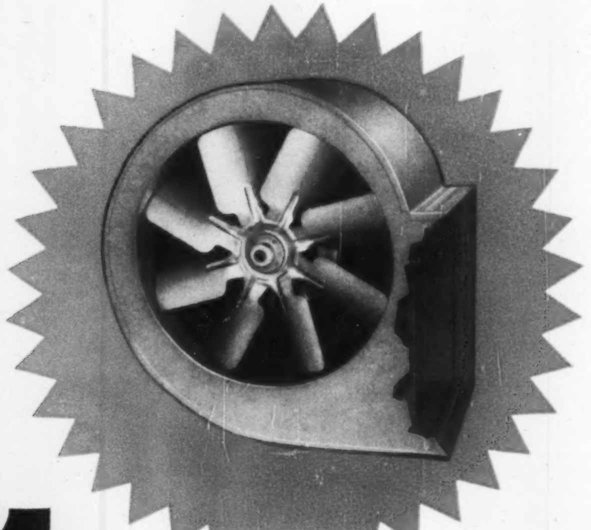
The Torrington RX Radiax blower introduces a new development in air impeller engineering.

It is a direct drive mixed-flow unit employing an exclusive Torrington design concept which results in the conversion of axially-developed air pressure into a radial flow pattern.

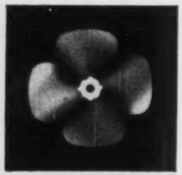
The result of this design breakthrough is a versatile unit that can be tailored to an extended range of customer needs by modification of the axial fan configuration to exact performance specifications. This eliminates dependence upon a variety of different sized units for varying requirements.

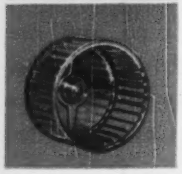
The RX offers three important advantages:

PERFORMANCE—A flat power curve makes it a non-overloading unit, permitting the use of a single smaller-capacity motor for varying applications, and availability of the unit in sizes heretofore too large for direct drive applications.



1st





CONSTRUCTION—A vertical center panel divides the unit longitudinally and supports the motor at its center of gravity. Resilient motor and fan mountings minimize noise and vibration. Result is quiet performance, and easy assembly and service.

ECONOMY—The basic design permits size reductions of as much as 36 per cent in the cubic dimensions of the unit, without sacrifice of performance. Thus, the RX is a thinner, more compact unit that can be fitted into tighter areas without choking of air intakes.

The design and performance of the RX give it a versatility that is of special importance to design engineers of air moving equipment. Full specifications are available.

THE TORRINGTON MANUFACTURING COMPANY

TORRINGTON, CONNECTICUT • VAN NUYS, CALIFORNIA • OAKVILLE, ONTARIO

A. I. A. FILE NO. 30-F-3
(JANUARY 1958)

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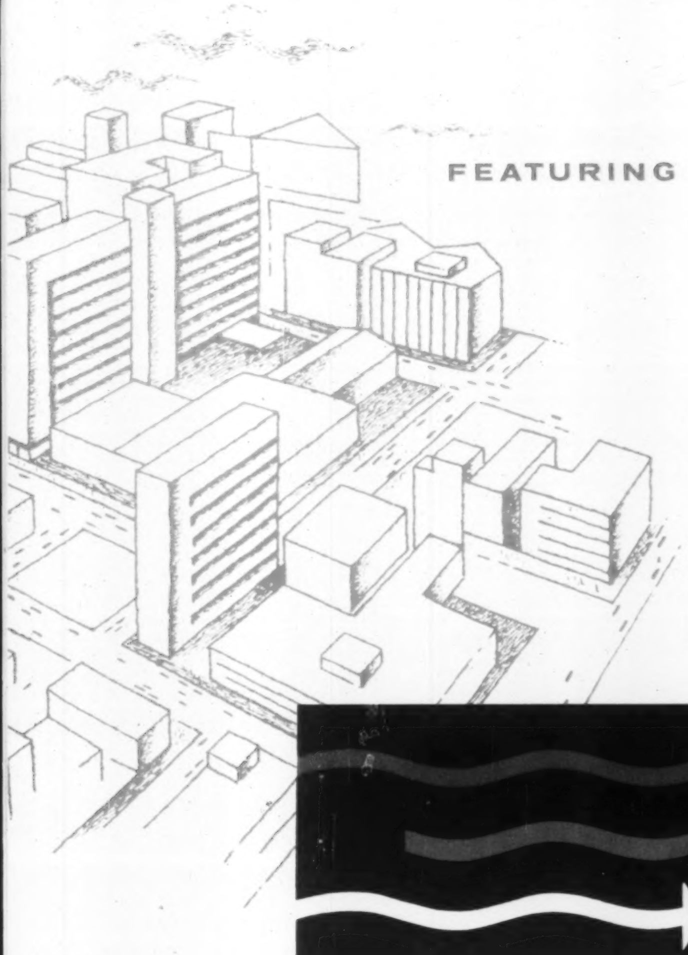
Fluor COOLING TOWERS

for AIR CONDITIONING and REFRIGERATION SERVICE



FEATURING "POLYGRID" Polystyrene Packing

Fluor Central Station Air Conditioning and Refrigeration Cooling Towers are an adaptation of the Fluor "Counterflo" Induced Draft Cooling Tower—a tower that has been proven in service in thousands of critical industrial installations throughout the world.

The Series 3 and Series 4 towers developed for air conditioning and refrigeration service incorporate many of the basic features of the "Counterflo" and, in addition, offer many innovations that meet—and exceed—the exacting architectural and operational requirements of modern-day central station cooling.

fp

A FLUOR TOWER gives you these extra features...

Counterflow Design An "Enclosed" system to permit longer, more intimate air-water contact by uniform distribution of air and water in an essentially true counterflow type of exchanger.

"POLYGRID" Packing Fluor Patented polystyrene fill gives more cooling per cubic foot than any other fill available — reduces total fill weight by 75% compared to conventional wood fill.

Redwood Distributing System Completely non-corrosive . . . header and laterals of redwood stave construction banded with stainless steel . . . spray nozzles of non-ferrous material.

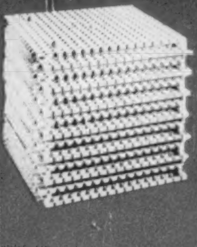
Rugged Construction Entire tower structure including through-bolted compression type joints, withstands 30 pounds per square foot wind loading, in accordance with U. S. Forest Products Handbook.

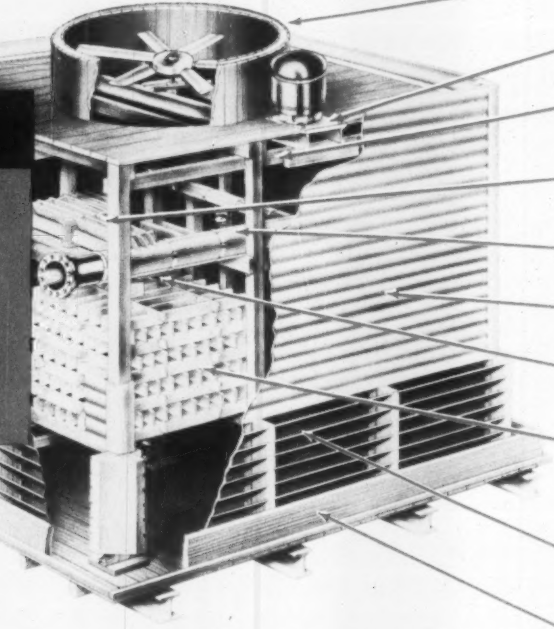
Fluor SERIES 3
COOLING TOWER

The Series 3 cooling tower is designed for central station air conditioning and refrigeration. Common single cell sizes for installations ranging from 40 to 400 tons of refrigeration are offered as standard units.

Featuring NEW FLUOR Patented "POLY-GRID"

Fluor patented "Poly-Grid" is furnished as standard fill in both the Series 3 and Series 4 Fluor tower. It is a high impact polystyrene fill that provides more cooling per cubic foot than any other fill available . . . reduces total fill weight by 75% when compared to conventional wood fill.




Low Profile Fan Stack
Unitized Motor and Fan Support
Code Approved Structure
Two-Pass Drift Eliminator
Spray Nozzles
Sheathing
Redwood Pipe Distributing System
Nailless Redwood Filling (or "Poly-Grid" polystyrene fill)
Removable Louvers on 4 Sides
Redwood Basin

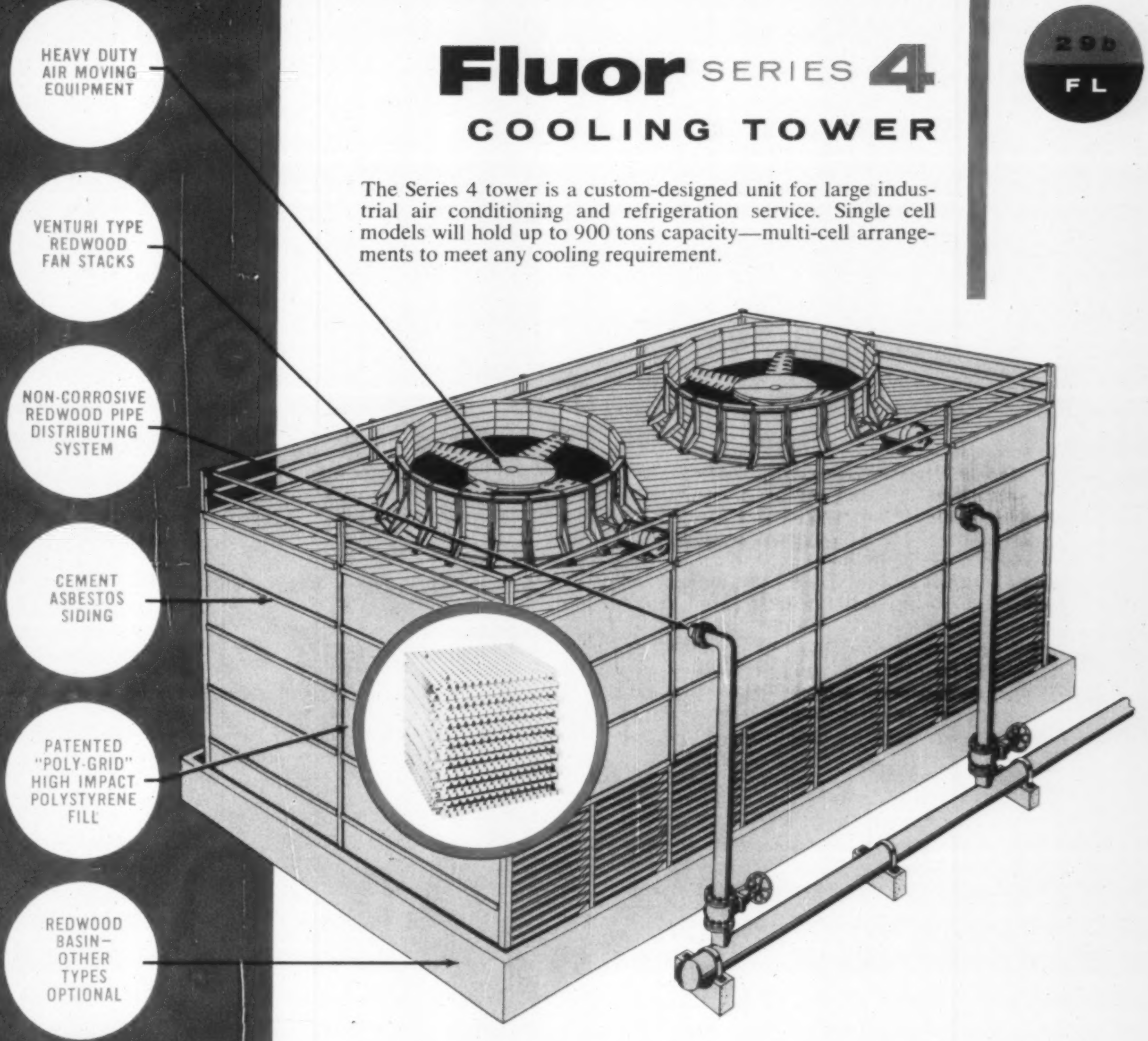
The Series 3 cooling tower is furnished in a multiplicity of cell sizes to fit various space requirements. Architecturally, it offers a low profile with no orientation limitations. Structurally, its standard design meets all local and regional building codes. Ease of erection in the Series 3 is accomplished by simplicity of structural design and economy of prefabricated and pre-assembled parts. Erection can be made consistent with the timing of overall construction program with or without the services of a Fluor superintendent.

ENGINEERING DATA

MODEL NO.	LENGTH	WIDTH	HEIGHT	PUMPING HEAD	H.P.	SHIPPING WT.
860	8′	8′	8′	8′ 5″	3	5540
875	12′	8′	8′	8′ 5″	5	7300
8125	12′	12′	8′	8′ 5″	7.5	9840
1060	8′	8′	10′	10′ 5″	3	6680
1075	12′	8′	10′	10′ 5″	3	8960
10100	12′	8′	10′	10′ 5″	5	9450
10125	12′	12′	10′	10′ 5″	7.5	11000
10150	12′	12′	10′	10′ 5″	7.5	12700
10175	16′	12′	10′	10′ 5″	7.5	15400
10200	16′	12′	10′	10′ 5″	10	16100
10275	20′	12′	10′	10′ 5″	15	18000
10300	16′	16′	10′	10′ 5″	15	19700

Fluor SERIES 4
COOLING TOWER

The Series 4 tower is a custom-designed unit for large industrial air conditioning and refrigeration service. Single cell models will hold up to 900 tons capacity—multi-cell arrangements to meet any cooling requirement.


HEAVY DUTY AIR MOVING EQUIPMENT
VENTURI TYPE REDWOOD FAN STACKS
NON-CORROSIVE REDWOOD PIPE DISTRIBUTING SYSTEM
CEMENT ASBESTOS SIDING
PATENTED "POLY-GRID" HIGH IMPACT POLYSTYRENE FILL
REDWOOD BASIN—OTHER TYPES OPTIONAL

The Series 4 is individually designed to specific duty.
Filling is selected to balance tower size with total fan and pump horsepower.
Air moving equipment is matched to the design cooling load.
Structural design is based on conditions applicable at the site of *your* tower, and includes earthquake and/or hurricane load factors recommended by local and regional building codes.

Physical Dimensions

Tower height (above curb) to fan deck 17'-0"

Fan stack height 4'-0"

Riser height (above curb) 12'-2"

Static pumping heat (above curb) 15'-8" (including nozzle loss, but not riser pipe friction)

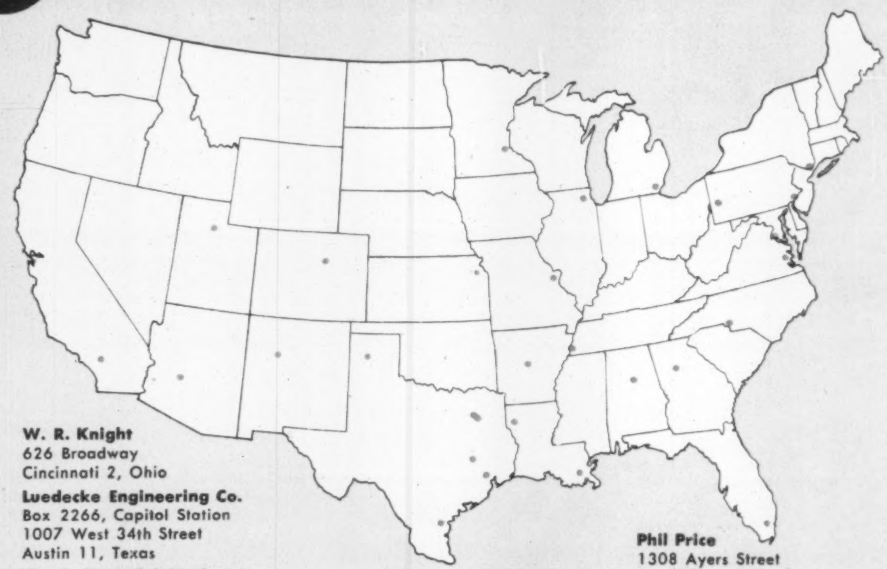
Tower sizes: 12'x12' to 24'x24' Single Fan Cells.

Multiplicity of cell combinations available to customer requirements.

In the Series 4, efficient design and low profile are combined to offer unsurpassed performance with no orientation limitations. It incorporates the same rugged, heavy duty air moving equipment already proven in thousands of Fluor Industrial Cooling Towers . . . Fluor-Solar stainless steel fans . . . Fluor-Western spiral bevel gears rated for infinite life . . . heavy duty galvanized steel motor and gear support . . . no-lubrication type flexible coupling with floating shafts . . . standard NEMA Type TEFC horizontal drivers . . . a combination that means dependable 24 hour a day performance, at the lowest possible maintenance cost.

Fluor
PRODUCTS COMPANY

Air Conditioning and Refrigeration Division Agents



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P. O. Box 598
Albuquerque, New Mexico

Boyd Engineering Co.
P. O. Box 3605
609 N. Laurel Street
El Paso, Texas

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2842 West Grand Blvd.
Detroit 2, Michigan

J. A. Brown Co.
Room 1916
1616 Walnut Street
Philadelphia 3, Pa.

J. W. Cherry Co.
150 Olive Street
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5420 Johnson Drive
P. O. Box 966
Mission, Kansas

Flinn Engineering Co.
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P. O. Box 8027
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Memphis 4, Tennessee

Hairston & Company
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Hairston & Company
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Fluor Products Company
589 Fifth Avenue
New York 17, New York

Fluor Products Company
The Equitable Life Bldg.
Room 2360
120 Montgomery Street
San Francisco, California

Fluor Air Conditioning and Refrigeration Cooling Towers are available through exclusive representative companies in all major market areas. Experienced service and erection personnel are strategically located to render close customer contact when and where needed.

Fluor Cooling Towers for central station air conditioning and refrigeration service meet optimum architectural, operating and performance requirements. In keeping with Fluor's long standing reputation for quality and appearance, special emphasis has been placed on the Series 3 and Series 4 Towers to make them the best available to the Air Conditioning and Refrigeration industry.

★ Data requirement for bid

1. Type of service
2. Water circulation rate or tons of refrigeration
3. Inlet water temperature
4. Outlet water temperature
5. Wet bulb temperature
6. Type and quantity of water contamination, if any
7. Wind loading (Normal design 30 lbs./sq. ft.)
8. Power source and characteristics
9. Type of fan drive desired
10. Location and size of adjacent structures
11. Type of collecting basin, redwood, steel or concrete

fp

AIR CONDITIONING & REFRIGERATION COOLING TOWER DIVISION

FLUOR PRODUCTS COMPANY

A DIVISION OF THE FLUOR CORPORATION, LTD.

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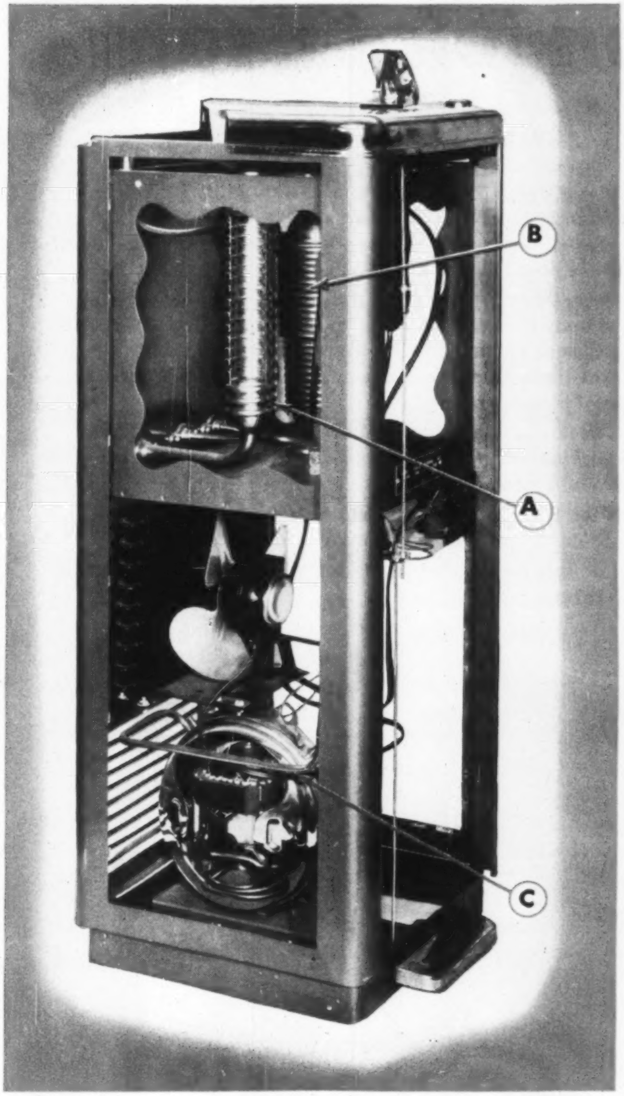
There's COLD in them thar FOUNTAINS



TEMPRITE DESIGNERS USE WOLVERINE TUBE

In the Temprite Products Corporation water cooler illustrated here, there are three individual applications of Wolverine copper tube:

A. The spun end heat exchanger and the tubing coiled around it (shown again at right below).

B. Wolverine commercial refrigeration copper tube is coiled around the cooler proper.

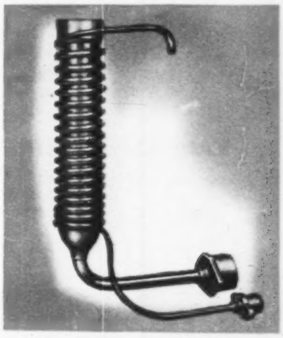
C. The capillary tubing from the condenser to the evaporator.

This Temprite application is an excellent example of the wide variety of tubular products manufactured by Wolverine Tube for American industry.

The Wolverine copper commercial refrigeration tube, for example, which carries the refrigerant that cools the water in the cooler, is of the highest quality available. It is clean, dry, consistent in temper and produced to the most exacting dimensions.

The spun end heat exchanger is the product of Wolverine's Copper Spun End Process† which eliminates many machining and assembly operations in turning out one-piece tubular parts with partially or fully closed end treatments. It takes the cold drain water and serves as an exchanger to pre-cool fresh water coming into the cooler.

In Wolverine Capilator®, Temprite design engineers utilized a capillary tubing manufactured expressly for precision control in the metering of liquids and gases. *Capilator is held to such close tolerances that it can be produced to meet customers' stated flow requirements.* It does exactly this for Temprite's quality cooler line which is manufactured at Temprite's plant in Birmingham, Michigan.



Products such as these are the result of Wolverine's Tubemanship program. Your company, too, can benefit from Wolverine's experience, research and sound engineering. For complete information about Wolverine products and services write for your copy of the Wolverine General Products Catalog.

BUY WOLVERINE TUBE—IT'S MADE IN AMERICA!

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WOLVERINE TUBE
DIVISION OF
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Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

†A PATENTED PROCESS RE 22465

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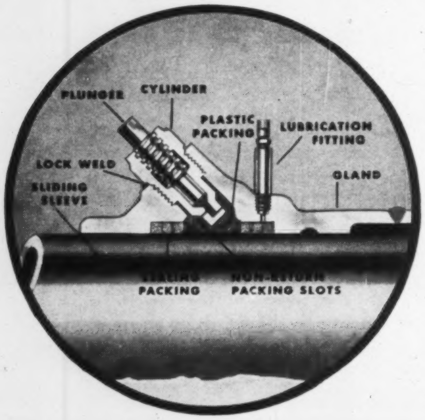
new savings
for expansion joint users

Cross-section of Gun-Pakt feature. To add packing, just add a plug and turn the plunger. Note non-return packing slots at bottom of cylinder.



The Yarway Type W Gun-Pakt Expansion Joint has an improved one-piece design of body and gland and improved method of packing that provide new maintenance economies and greater operating efficiency.

Bolted joint between body and gland is eliminated; the steel body includes gland and guide. Shorter face-to-face dimensions are possible. Improved angle of packing guns makes them more accessible and *permits injection of the special plastic packing directly into packing space.*

The famous Yarway *Gun-Pakt* feature permits *addition of packing under full steam pressure. No need for costly shutdowns to repack.*

Sizes 1½" to 30", pressures 150, 300, 400 psi. Single or double types, flanged or welding ends.

For full description, write for new Yarway Bulletin EJ-1916.

20" Yarway Type W Gun-Pakt Joint with base, single type, welding ends, 8 guns.

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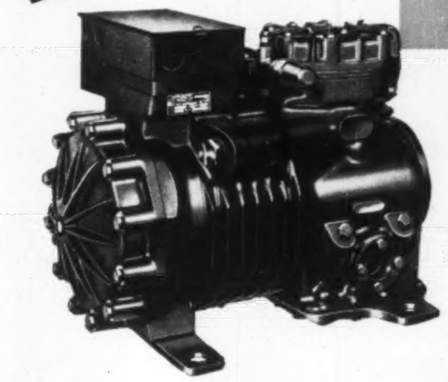
YARWAY **GUN-PAKT**

...a good way to specify expansion joints

FIELD-PROVEN...RUGGED...QUIET...LOW-PRICED

ACCESSIBLE

4 H.P. and 5 H.P. COPELAMETIC



MOTOR-COMPRESSORS GIVE YOUR EQUIPMENT SUPERIOR PERFORMANCE

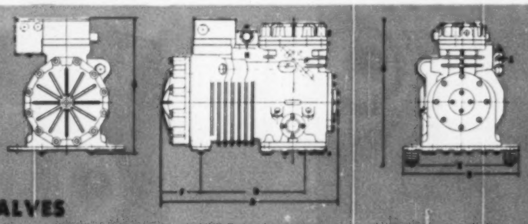
The hottest news yet in cooling! That's the best way to describe these latest achievements of Copeland research and development. They are just what the industry needs for the big residential and commercial market utilizing these sizes.

These new compact Copelametic motor-compressors will give all the long-time, carefree service traditionally engineered into every Copeland product. They're quiet, rugged, accessible. And, of course, they have been field-proven and are competitively priced. All single-phase models are inherent-protected—three-phase models available with external inherent-protectors.

These motor-compressors are added evidence you can always count on Copeland.

SINCE 1918
Copeland REFRIGERATION CORPORATION, Sidney, Ohio

SPECIFICATIONS AND CAPACITY DATA



DIMENSIONS AND SHUT-OFF VALVES

Model	H.P.	A (Max.)	B (Max.)	C	D	E	F	G	H—Suct. SOV		J—Discharge SOV	
									Tube O.D.	Type	Tube O.D.	Type
LRH-400	4	19 7/16"	13"	16 3/32"	11 5/8"	11"	4 3/16"	14 19/32"	1 1/8"	S	5/8"	S
LRG-500	5	19 7/16"	13"	16 3/32"	11 5/8"	11"	4 3/16"	14 19/32"	1 1/8"	S	5/8"	S

COMPRESSOR DISPLACEMENT, REFRIGERANT, OIL CHARGE, WEIGHT

Model	H. P.	Cyls.	Bore	Stroke	CFH Disp. @ 1750 R.P.M.	Refrig.	Oil Recharge	WEIGHT	
								Net	Shipping
LRH-400	4	2	2 1/4"	1 7/16"	698	R-22	5½ pt.	236 #	253 #
LRG-500	5	2	2 7/16"	1 7/16"	815	R-22	5½ pt.	236 #	253 #

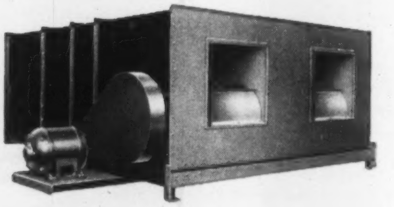
CAPACITY DATA (BTU/HR.)

Model	Evap'g Temp.	Suct. Press.	DISCHARGE PRESSURE											
			170.1 #	183.7 #	197.9 #	212.9 #	228.7 #	245.3 #	262.6 #	280.5 #	298.3 #	317.9 #	338.0 #	359.7 #
			CONDENSING TEMPERATURE											
			90°F.	95°F.	100°F.	105°F.	110°F.	115°F.	120°F.	125°F.	130°F.	135°F.	140°F.	145°F.
LRH-400	45°F.	76.6 #	68625	66500	64375	62000	59895	57750	55375	53000	50875	48250	45875	43625
LRG-500	45°F.	76.6 #	78300	76000	73600	71500	69100	66900	64500	61900	59600	57500	55200	53000

Based on 65°F. Suction Gas Temperature and no Heat Exchanger.

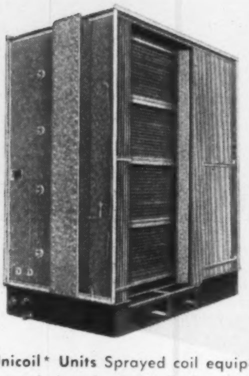
CLARAGE

...dependable equipment for making air your servant



Draw-Thru Multitherms* for comfort and process air conditioning applications. Sprayed coil units also available. **Catalog 1307. Hi-Static Multitherms** for pressures to 8" SP. **Bulletin 1312. Capillary Conditioners** for exceptional air cleaning. **Catalog 1351.**

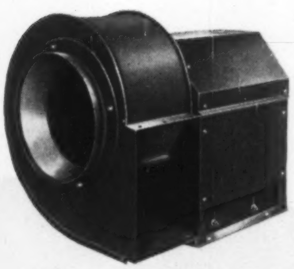
Air Washers Capillary (shown) and Spray Type Air Washers for air cleaning and purification. **Catalog 405** for Capillary type; **Catalog 400** for Spray type.



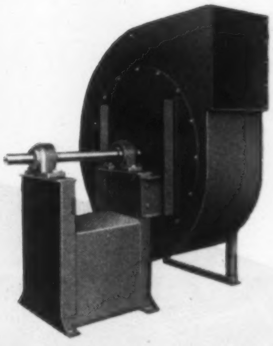
Unicoil* Units Sprayed coil equipment designed principally for cooling and dehumidifying service in central station air conditioning systems. Cutaway view above. **Catalog 411.**

Blow-Thru Multitherms* for zone control air conditioning. A single unit handles different needs simultaneously in different areas by a separate set of mixing dampers for each zone. **Bulletin 1310.**

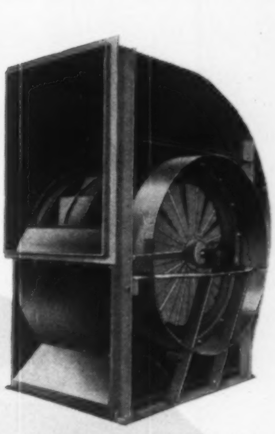
Clarage Fan Company



Ready Unit* Ventilating Sets Complete ready-to-run units for smaller air handling requirements. Direct connected (**Bulletin 500**) and V-belt models (**Catalog 515**) in 18 sizes, capacities 100 to 14,000 cfm.

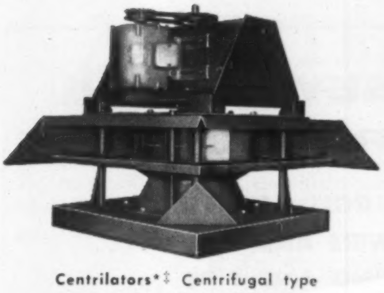


Type XL Fans range up to 130,000 cfm, 18" SP, 60" inlet diameter for industrial air and material handling assignments. Four wheel types, 16 fan sizes — smaller sizes adjustable as to discharge. **Bulletin 702.**

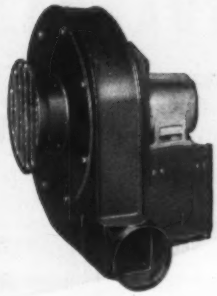


Ventilating and Air Conditioning Fans Type NH (shown) with backwardly inclined blade wheels, capacities 1,000 to 725,000 cfm. Catalog 221. Type HV Fans with forward curved multiblade wheels, capacities 150 to 450,000 cfm. Bulletin 200.

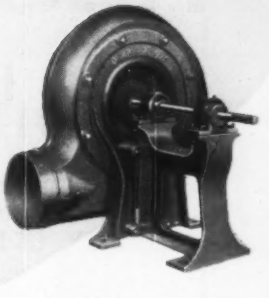
The Clarage line also includes Unitherm* Unit Heaters with multiblade fans, Catalog 1115 . . . Clarco* Unit Heaters with propeller fans, Catalog 1101 . . . Unit Stoker Fans, Bulletin 31 . . . Propeller Fans with capacities 700 to 36,000 cfm, Bulletin 520 . . . Vortex Control* for air volume regulation, Catalog 122 . . . Mechanical Draft Fans, Catalogs 905, 901, 802. By specializing — building air handling and conditioning equipment exclusively — Clarage has a concentrated "know-how" that means important dividends to you.



Centrilators*‡ Centrifugal type power roof ventilators with an exclusive Clarage Jet Siphon*‡ feature for quiet performance, high efficiency. 10 sizes, capacities to 26,400 cfm. Shown uncovered. **Bulletin 550.**



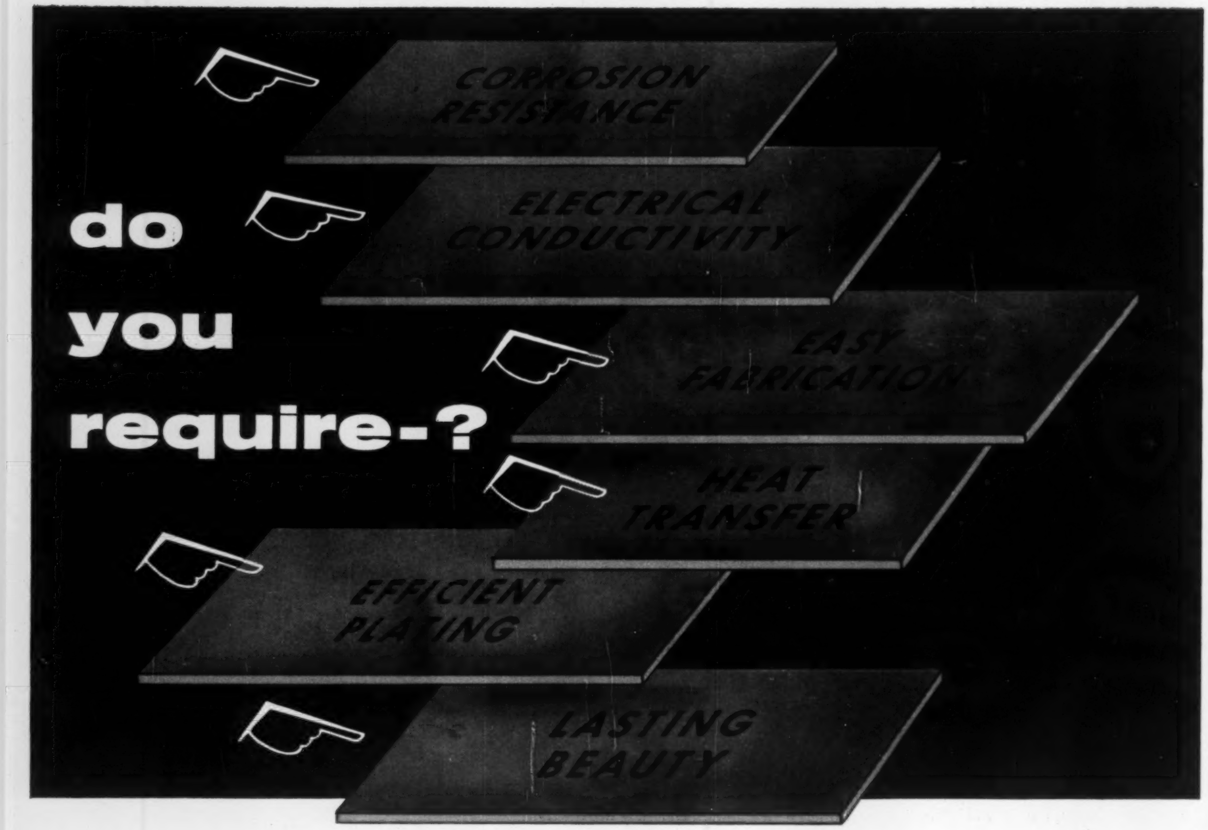
Type O Fans for industrial applications ranging to 50" SP and to 13,000 cfm. Wide selection of sizes and wheel diameters permits precise selection of the proper unit. **Catalog 855.**



Type CI Fans with cast iron housings, primarily for smaller volume exhaust applications. Capacities 200 to 3,800 cfm, pressures to 24" SP. Adjustable as to discharge. Two wheel types. **Catalog 705.**

*Trademark
‡Patent applied for

Kalamazoo, Michigan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HEAT TRANSFER
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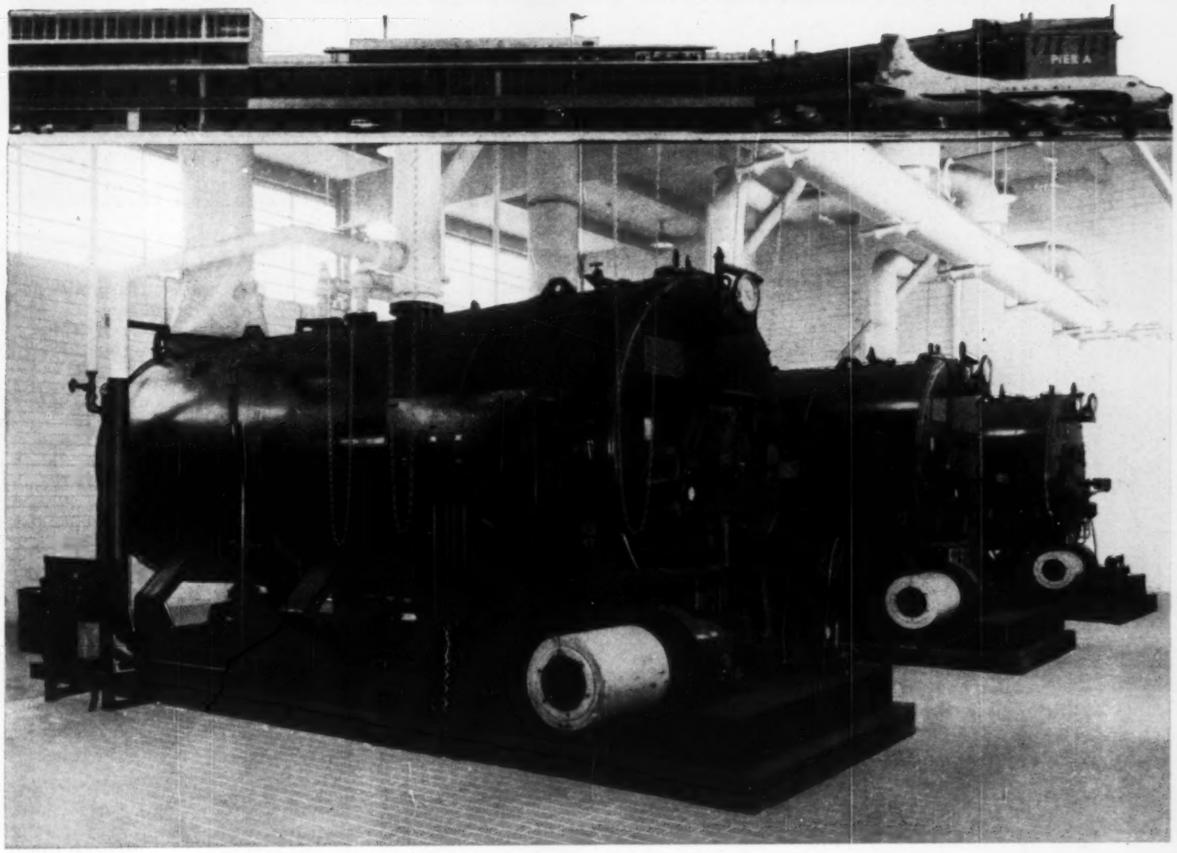

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Philadelphia International Airport is typical of our excellent air-age installations. In keeping with its modern facilities, Philadelphia's authorities selected these three 300 H.P. AMESTEAM GENERATORS for clean, automatic, dependable heat.

It is no coincidence that so many progressive organizations and firms choose "AMESTEAM" — its reputation for dependable performance goes back 110 years! Thus, when you get an AMESTEAM GENERATOR, you get the very best practical developments from this long experience. You get efficient Ames 3-pass firetube design that occupies minimum space. You get complete package construction with all parts furnished and backed by a single reputable manufacturer. You enjoy competent Ames 24-hour service.

In short, you're actually buying the low-cost steam that only a quality boiler can deliver. It's worth investigating!

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NEW! An Important Advance In Hydronic* Perimeter Heating!

National-U.S. Art Comfortline Baseboard

NEW Beauty · NEW Performance

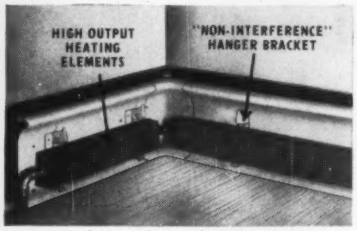
NEW Pre-cut Lengths for Faster Installation

*HYDRONICS—the science of heating and cooling with water

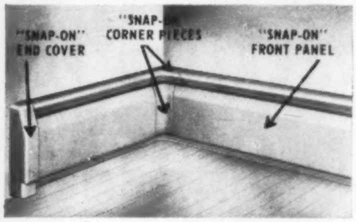
"Easiest to handle"

Says *George M. Hasbrouck,*
Sales Manager
Northrup Supply Corp.
Binghamton, New York

National-U.S. Art Comfortline Baseboard, pre-cut to convenient working lengths, is the easiest of the quality heat distributors to install. Simply connect the heating element, then merely "snap-on" the front panels and accessories. The savings in installation costs mean full profit margin to you and complete satisfaction to your customers.


HIGH OUTPUT HEATING ELEMENTS
"NON-INTERFERENCE" HANGER BRACKET

High capacity—quiet operation



Easy snap-on accessories

You benefit by these features:

UNSURPASSED IN APPEARANCE
"Stream-styled" accessories with rounded corners, bevelled front panels, and with wall behind back panel sealed off and concealed.

EASIER TO INSTALL
Now, Art Comfortline Baseboard comes to you in three, four, five or eight foot lengths, to save cutting and fitting time on the job. Just right for pre-fabs, too.

SUPERIOR IN PERFORMANCE
Improved fins and unobstructed sweep of air inlet and outlet openings, increased clearance between element and panels, and new design of hanger brackets and support hook account for more heating capacity and provide for normal expansion and contraction.

INCREASED OUTPUT RATING
The high capacity developed makes it possible to adequately heat most rooms with baseboard installed only against outside walls.

SNAP-ON ACCESSORIES
Save installation time and labor because you simply *snap-on* the accessories—front corners, splicers, end covers and access doors.

HEIGHT IS LOWER
Its unusually low height (only 8$\frac{5}{16}$") makes it inconspicuous—permits installation under picture windows.

ONE MODEL FOR BOTH FLUSH AND SEMI-RECESSED INSTALLATIONS

SEND FOR FREE DATA

Write today for catalog on the new Art Comfortline Baseboard and for Installation Folder that gives detailed information on this easy-to-install baseboard heat distributor.

Colorful consumer literature is also available.

Sunray
BASEBOARD

H-21

National-U.S. Radiator
CORPORATION

HEATING AND AIR CONDITIONING DIVISION
Johnstown, Pennsylvania

Why world's most modern hotel chose Sarco...

heating specialties · steam traps · temperature regulators · fin-tube radiation

The New Philadelphia
SHERATON HOTEL
Rooms – 1000
Cost – $16,000,000

When Philadelphia's new $16,000,000 Sheraton Hotel was planned, management deliberately set out to make it the last word in modern hotel design, construction and facilities . . . with unsurpassed QUALITY throughout.

For the heating system, requirements were most exacting . . . demanding not only the finest of equipment but very close and experienced manufacturer cooperation. That's why owner, architect, consulting engineer, and heating contractor agreed on:

Sarco Heating Specialties

Sarco strainers, radiator traps, radiator valves, balancing fittings, and air eliminators help insure quality heating all along the line. 103 Sarco Float Traps installed for dripping steam mains and equipment . . . because of high continuous-discharge capacity, proven reliability, and minimum maintenance.

Sarco Temperature Regulators

Specified for hot water tanks, because they're simple, SELF-POWERED, rugged, accurate. Quickly, easily installed. Seldom, if ever, require maintenance.

Sarcofin Radiation

One third mile of it chosen because of:— (1) dependable, high quality construction; (2) Sarco's field engineering service . . . with its on-the-job measurements and close cooperation with engineer and contractor; (3) ability to deliver custom-built radiation to critical dimensions.

Sarco Undivided Responsibility

Sarco . . . the single source of supply for this heating equipment . . . assumed complete responsibility for all of it. This unit responsibility simplified design, specification, and purchasing, made possible closer on-the-job coordination . . . insured the same high standard of quality for all heating products in the group.

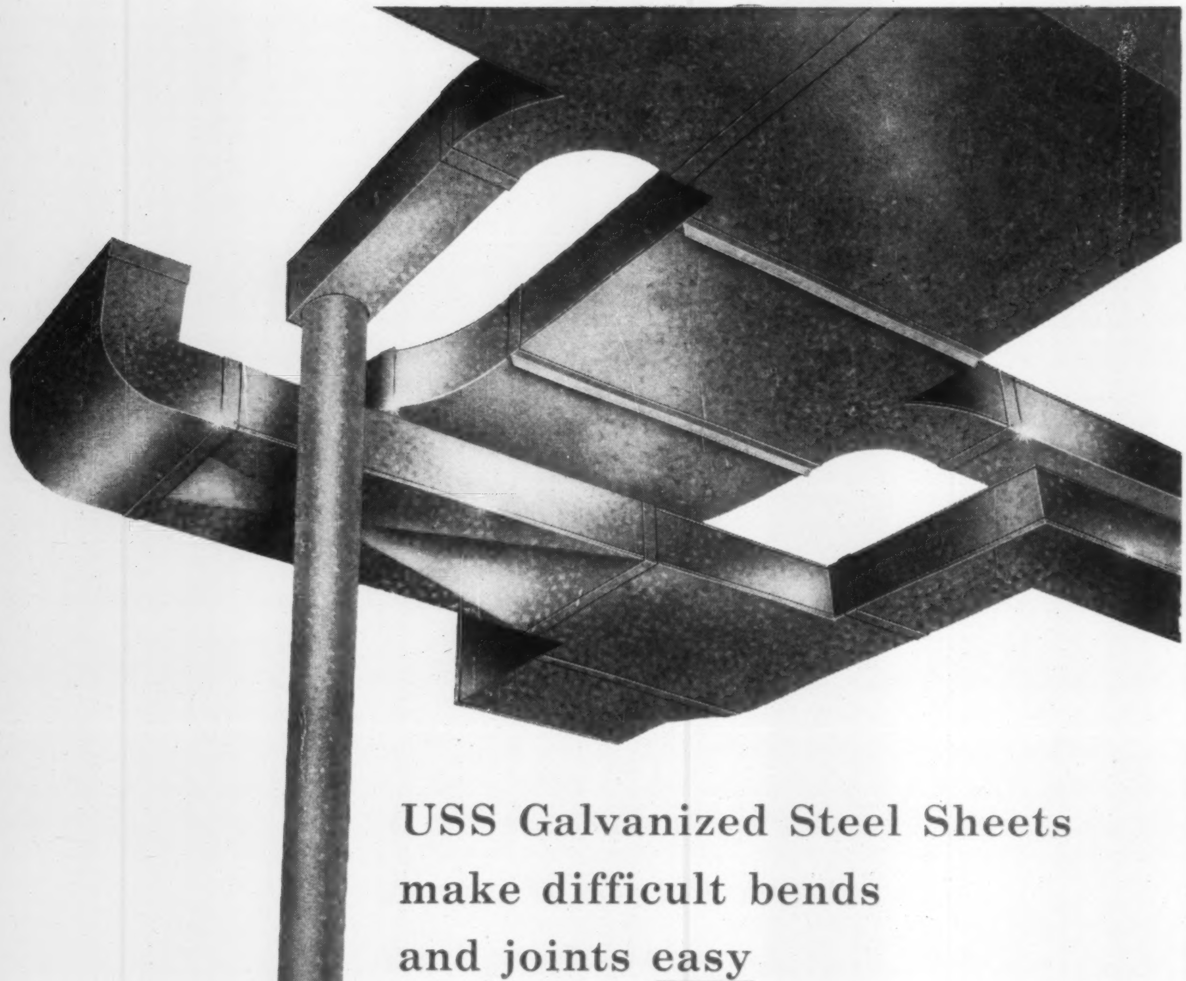
SARCO COMPANY, INC.
635 Madison Ave., New York 22, N.Y.

Architects: Perry, Shaw, Hepburn & Dean, Boston, Mass. **Consulting Engineer:** Slocum & Fuller, New York City. **Heating Contractor:** Ambrose Augusterfer Corp., Philadelphia, Pa. **Builders:** McCloskey & Co., Philadelphia, Pa.

SARCO 2249-B

An affiliate of Sarcotherm Controls, Inc.

PRODUCTS YOU CAN REST YOUR REPUTATION ON



USS Galvanized Steel Sheets make difficult bends and joints easy

When you use USS Galvanized Steel Sheets for your intricate and difficult ductwork jobs, you will find that these sheets are easy to handle and form, that they assure consistently satisfactory results. USS Galvanized Steel Sheets are uniform in flatness, ductility and finish. They can be cut, bent, soldered, lock seamed and rolled . . . and the tightly-adhering coating of zinc will not chip or flake or crack.

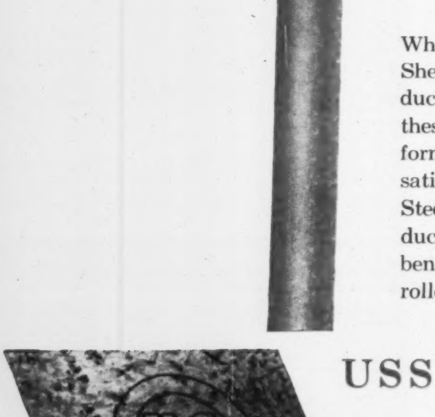
Specify and use economical and durable USS Galvanized Steel Sheets for your next heating and air-conditioning duct installation. For more information on these fine, quality galvanized steel sheets, get in touch with the nearest Sales Office of United States Steel.

USS GALVANIZED STEEL SHEETS

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

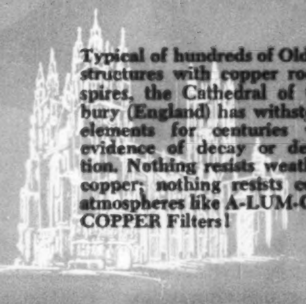
UNITED STATES STEEL



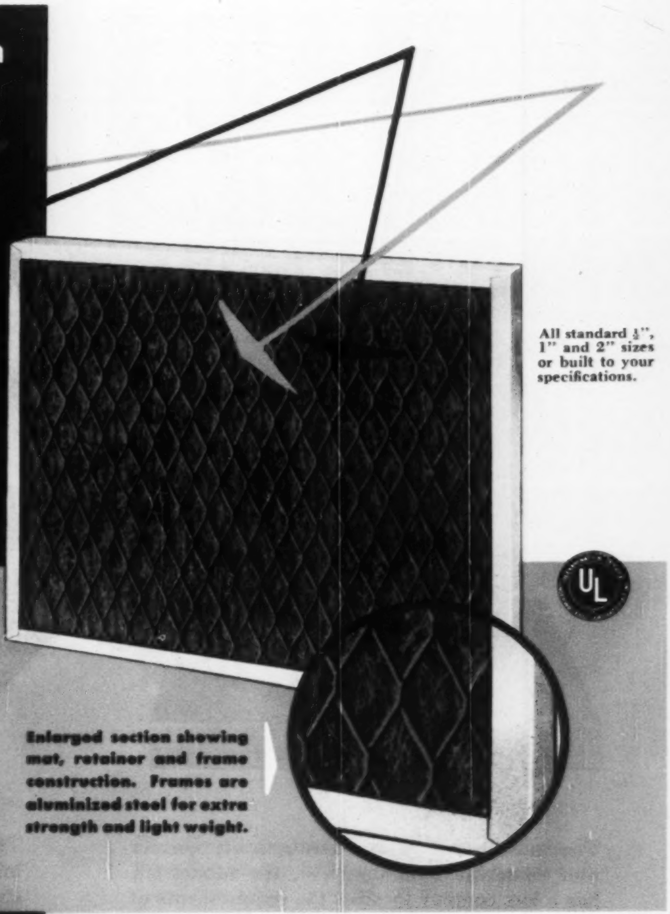
stop wasting money on '*throw-aways*' with new

A-LUM-O-AIRE COPPER FILTERS

designed for industrial air-cleaning requirements



Typical of hundreds of Old World structures with copper roofs and spires, the Cathedral of Canterbury (England) has withstood the elements for centuries without evidence of decay or deterioration. Nothing resists weather like copper; nothing resists corrosive atmospheres like A-LUM-O-AIRE COPPER Filters!



Enlarged section showing mat, retainer and frame construction. Frames are aluminized steel for extra strength and light weight.

All standard ½", 1" and 2" sizes or built to your specifications.

RESISTS RUST and CORROSION

Impervious to hazardous industrial atmospheres, new A-LUM-O-AIRE COPPER Filters are the practical solution for handling corrosion and moisture-laden fumes, vapors and gases. Copper wool, used as the filter media, is manufactured by Carey to precision standards from special alloys developed expressly for air cleaning. Mat retainers are copper plated for longer life with added protection against rusting and corrosion.

QUICKLY CLEANED for CONTINUOUS USE

Simply flush A-LUM-O-AIRE COPPER Filters with water or solvent and replace. No hazardous oils to add; no messy adhesives required. END pyramiding filter replacement costs NOW with the filter designed for the rugged demands of industry. Available in standard and high-velocity types for normal resistance or engineered to your specific size and capacity requirements.

Carey
ELECTRONIC ENGINEERING CO.
METAL WOOL DIVISION
SPRINGFIELD, OHIO

"world's largest manufacturers aluminum and copper wool"

If filtered air is important to your production or operating schedules, here NEWS you can't afford to pass up! Why? Because A-LUM-O-AIRE COPPER Filters save on replacements, eliminate maintenance expense and increase air cleaning efficiency!

Like to see the proof? Then, write for folder showing typical performance curves and operating data — or send us your specifications with prints or detailed drawings for prompt recommendations and quotations. No charge or obligation, of course!

America's first practical recleanable all-metal, dry-type air filter! Approved by Underwriters (Class 1)!

A-lum-O-Aire

MAIL THIS COUPON TODAY

Carey Electronic Engineering Co.
Metal Wool Division Dept. H-18
1880 Clifton Avenue
Springfield, Ohio

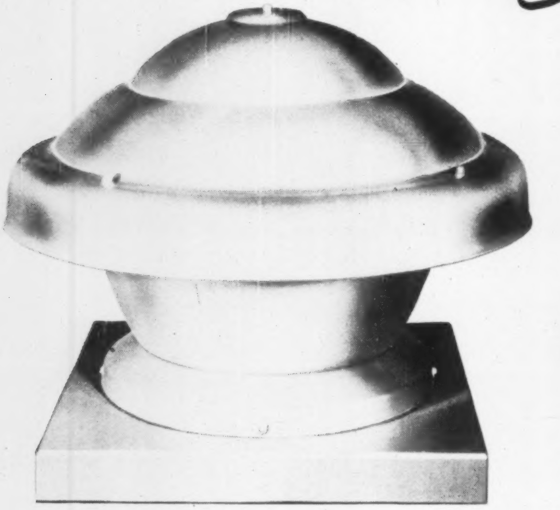
☐ send folder
☐ we're sending data for quote

Tell me more—
about your new A-LUM-O-AIRE Filters and show me how we can save money on our air-cleaning activities.

Name________________ Title________
Company________________
Address________________
City____________ Zone__ State______

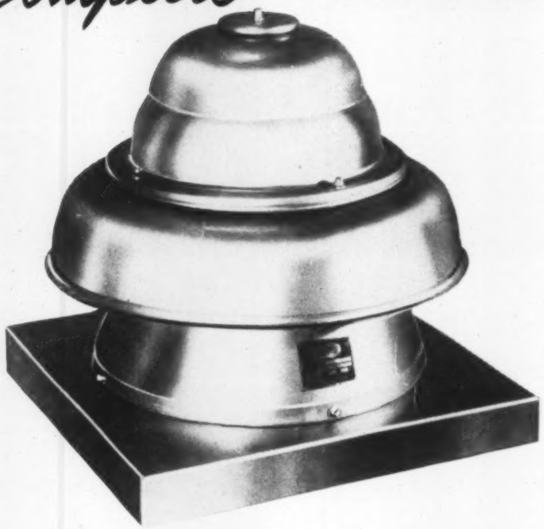
SPECIFY CARNES ROOF

THE FIELD'S MOST *Complete* LINE WITH



MODEL CL

The most beautiful and aesthetically correct roof ventilator ever designed, the Model CL has a low contour to meet the requirements of today's low parapet buildings.



MODEL AX

The Model AX Power Roof Ventilator combines modern low styling with rigidly constructed heavy gauge aluminum.

Check these Features

✓ MODERN "LOW SILHOUETTE" DESIGN

The popular streamlined mushroom-styled spun aluminum ventilators, with an extremely low silhouette, are a must on low parapet buildings. Constructed for adverse weather conditions, the housing is completely weatherproofed.

✓ CENTRIFUGAL FAN

Centrifugal fan wheel backwardly inclined; non-overloading characteristics. Statically and dynamically balanced. Runs smooth and trouble-free. Turbulence at minimum.

✓ ALUMINUM CONSTRUCTION

Housing spun from heavy gauge aluminum for added strength and rigidity. Withstands rust and corrosion and always presents a neat, new looking appearance. No maintenance finishing required.

✓ MOTOR FEATURES

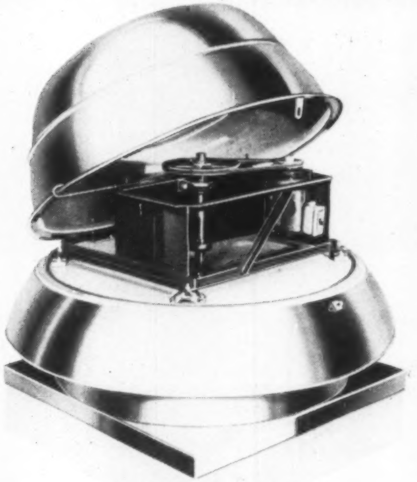
Sealed ball bearing motor designed for years of trouble-free service. Lubrication of motor not required for its normal life expectation. Explosion proof and two-speed motors available for most models.

✓ MAXIMUM CAPACITY

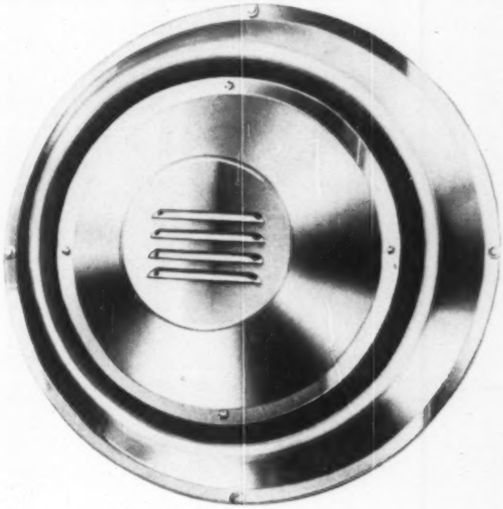
The new centrifugal wheel design gives more CFM capacity at lower tip speeds. The inlet area of the wheel has been increased, which decreases turbulence and inlet velocities, resulting in a reduced noise level

and SIDEWALL VENTILATORS

THE MOST *Wanted* FEATURES!



MODEL J



MODEL W

The Model J has an extremely low silhouette, with pleasing compound angles, designed for year-round weather conditions as well as sight appeal.

The Model W exhauster is streamlined, easily installed, and completely weatherproofed without restricting discharge air flow.

✓ QUIET OPERATION

Extremely smooth and quiet operation. Noise and vibration at minimum due to full-floating vibration isolators, balanced rotating components and special attention to elimination of chamber resonance.

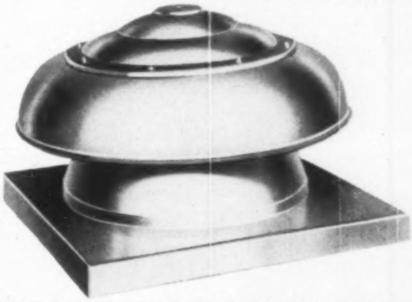
✓ ELECTRICAL COMPONENT HOUSING

Motors mounted out of air stream in ventilated housing, properly cooled and protected for long life. Heavy flexible ground strap to bleed static charges from floating island and keep them away from electrical components.

✓ LARGE RANGE OF SIZES

Mushroom styled units up to sizes including 48" wheel diameters. No longer is it necessary to change styles when greater CFM output is required. A large choice of speeds is featured in both direct and belt driven units.

Member - Air Moving and Conditioning Association



MODEL RV RELIEF VENT

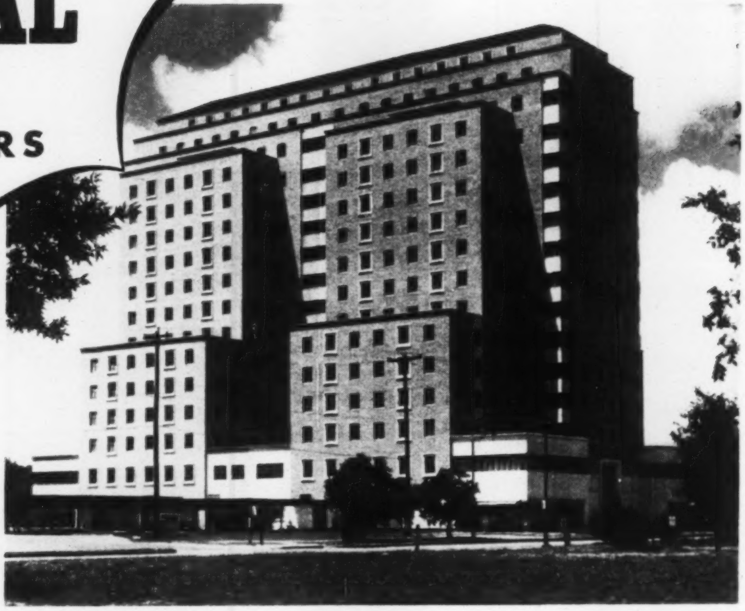
The Carnes Model RV Relief Vent is a weatherproof outlet for use in relief of positive pressure areas or it may be used as an air intake. Designed to resemble and harmonize in appearance with the Carnes power roof ventilators, they are used in place of unattractive and unsightly hoods and gooesnecks.

CARNES
corporation
VERONA, WISCONSIN

. . . and uses

THERMAL

AIR CONDITIONERS



In the recently completed Hermann Professional Building Addition* in the famous Texas Medical Center, Houston, seven big Thermal central plant air units provide conditioning of primary ventilation air and furnish year around air conditioning comfort for the interior zones of the structure. Other Thermal equipment is also in use in the original building constructed several years ago.

Thermal Engineering manufactures a complete line of central plant and multizone conditioners, sprayed coil units, heating and ventilating units, heating and cooling coils and air-cooled condensers. Write for catalog and list of other outstanding buildings using Thermal equipment. Thermal products can be specified with the confidence they will give years of satisfaction.

*Left half of illustration
Consulting Engineer:
Bernard Johnson and Assocs.

Agents in principal cities.

Quality Products Since 1945.

THERMAL ENGINEERING CORPORATION

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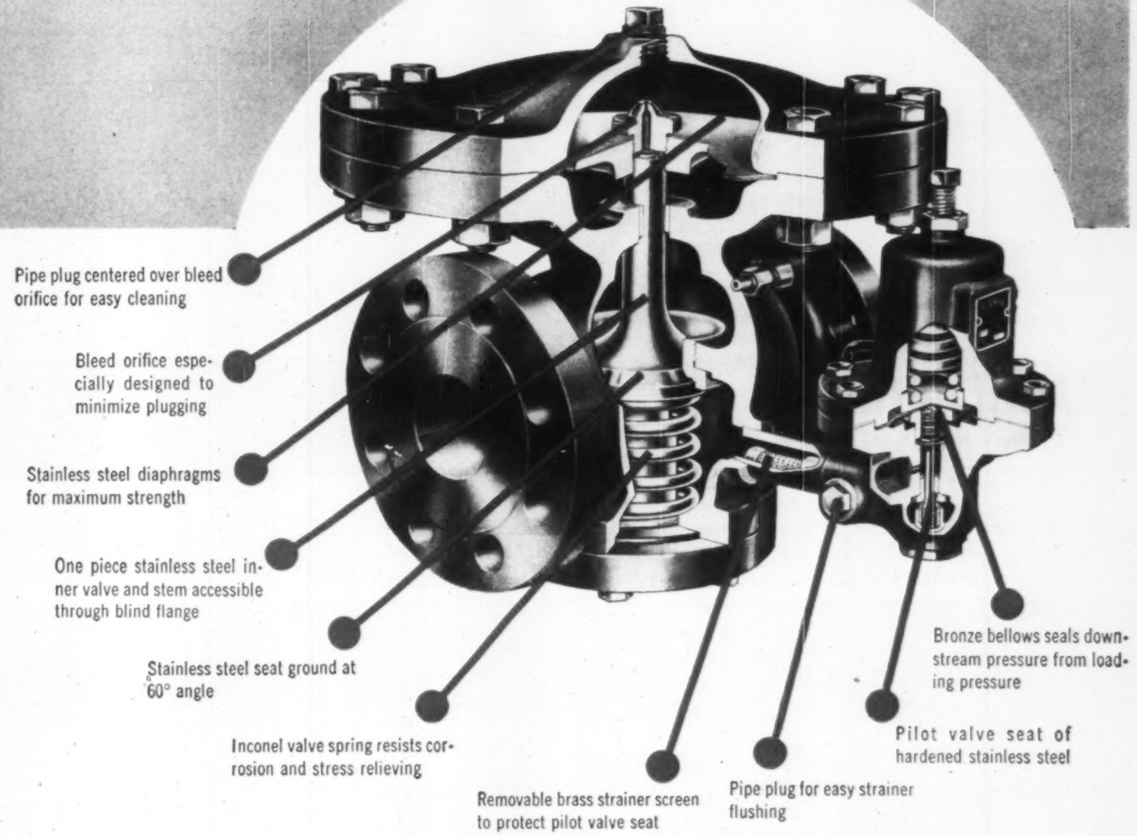
HOUSTON 19, TEXAS

THE FISHER® 92B

IMPROVED

TO MINIMIZE PROBLEMS INHERENT IN STEAM SERVICE


Pipe plug centered over bleed orifice for easy cleaning
Bleed orifice especially designed to minimize plugging
Stainless steel diaphragms for maximum strength
One piece stainless steel inner valve and stem accessible through blind flange
Stainless steel seat ground at 60° angle
Inconel valve spring resists corrosion and stress relieving
Removable brass strainer screen to protect pilot valve seat
Pipe plug for easy strainer flushing
Pilot valve seat of hardened stainless steel
Bronze bellows seals downstream pressure from loading pressure

Not content with the enviable performance record of the Type 92A, Fisher engineers have improved this pilot operated pressure reducing valve to a new peak of performance.

For extremely accurate, long trouble-free service, put a Fisher 92B in the line. One pilot with three interchangeable springs provides a range of from 2 to 150 psi. • ***Send for Bulletin D-92 today.***

*Engineers with special problems . . . find the **answer** in . . .*

FISHER® *Controls*

FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Ontario

Monarch

SPRAY NOZZLES

for

AIR WASHERS . . . COOLING TOWERS

These are "non-clogging" nozzles with a single large tangential lead hole to the swirl chamber that will never clog from any impurities small enough to pass through the orifice. Swirl chamber is conical on both ends and pivots liquid like a top to produce an exceptionally fine, evenly distributed, balanced spray of about 80° included angle. Wider spray angles up to 130° can be furnished to order.

Standard material Brass. Also available in Stainless Steel and Monel. Pipe size from 1/8" to 1". 1/4" size is 1-5/16" long and made from 5/8" square stock.

CAPACITIES: GALLONS PER HOUR

Pipe Size and Fig. No.	Orifice	Lead	OPERATING PRESSURE: LBS. PER SQUARE INCH							
			5	10	20	30	40	60	80	100
1/8" Fig. 629	69	69			2.7	3.3	3.8	4.7	5.4	6.0
	61	61			4.2	5.1	5.9	7.2	8.3	9.2
	61	53	2.7	3.7	5.3	6.5	7.5	9.2	10.5	11.8
	53	53	4.0	5.7	8.2	10.0	11.5	14.1	16.3	18.2
	49	49	5.6	7.9	11.1	13.6	15.7	19.3	22.2	24.8
1/4" Fig. 629 or Fig. 631	3/32	3/32	9.6	13.5	19.2	23.4	27.0	33.0	38.4	42.9
	1/8	3/32	12.2	17.3	24.4	29.9	34.6	42.4	49.0	54.9
	1/8	7/64	14.6	20.6	29.1	35.7	41.0	50.4	58.4	65.1
	1/8	1/8	15.9	22.5	31.9	39.2	45.1	55.2	63.7	71.5
	11/64	1/8	21.7	30.6	43.2	53.0	61.1	75.0	86.4	98.0
1/4" Fig.629 or Fig. 631	3/16	5/32	30.5	43.2	61.1	74.9	86.4	107	122	136
	7/32	3/16	45.1	63.8	90.5	110	128	156	180	202
	13/64	13/64	54.7	77.8	108	134	155	191	217	246
	7/32	7/32	59.8	84.5	120	146	169	207	240	267

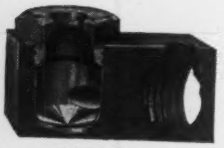


Fig. 631

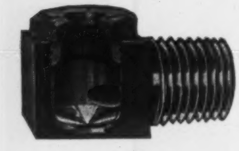


Fig. 629

HUMIDIFIERS . . . . . . AIR CONDITIONERS

The H-261 and F-80 brass nozzles produce the finest, softest, fog-like spray possible with low direct pressure only. Popular sizes are nozzle 3.00 and 5.00 tested either 80° or 120° at 25 pounds.

All Brass construction with 120 mesh Monel screen strainers and 1/8" or 1/4" female or 1/4" male pipe connection in the F-80 and 1/4" male only in the H-261. The H-261 is 1 3/8" overall and the F-80, 1 7/8".

CAPACITIES: GALLONS PER HOUR

Nozzle No.	OPERATING PRESSURE: LBS. PER SQUARE INCH							
	10	25	30	35	40	60	80	100
1.35					* .57	.70	.81	.90
1.65					* .75	.92	1.06	1.18
2.00				* .87	.94	1.14	1.32	1.49
2.50			* .98	1.01	1.13	1.39	1.60	1.80
3.00		1.00	1.10	1.18	1.27	1.55	1.79	2.00
3.50		1.30	1.41	1.54	1.64	2.01	2.32	2.60
4.00		1.50	1.64	1.78	1.90	2.33	2.69	3.00
4.50		1.90	2.09	2.25	2.40	2.94	3.40	3.80
5.00		2.20	2.41	2.60	2.78	3.41	3.94	4.40
5.50		2.40	2.63	2.84	3.04	3.72	4.30	4.80
6.00		2.60	2.85	3.08	3.28	4.03	4.66	5.30
7.00		3.00	3.30	3.55	3.80	4.65	5.37	6.00
7.50	2.02	3.20	3.50	3.78	4.05	4.96	5.74	6.40
8.30	2.27	3.60	3.95	4.27	4.55	5.58	6.45	7.20

Fig. H-261

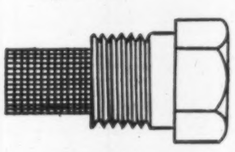
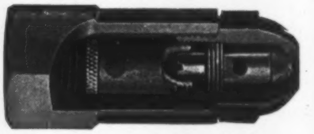


Fig. F-80 Brass



OIL BURNERS

Monarch Stainless Steel Nozzles for high pressure gun-type oil burners are the Industry yardstick for nozzle performance. Each nozzle individually tested for capacity, spray angle and uniformity of spray on No. 2 fuel oil weighing 7.16 pounds per gallon at 74°F. and 34 S. S. U. viscosity at 100°F. Standard spray angles are 30°, 45°, 60°, 70°, 80° and 90° in small sizes.

Standard capacity sizes (GPH at 100 psi.): .50, .60, .75, .85, 1.00, 1.10, 1.20, 1.25, 1.35, 1.50, 1.65, 1.75, 2.00, 2.25, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00, 5.50, 6.00, 6.50, 7.00, 7.50, 8.30, 9.50, 10.50, 12.00, 13.80, 15.30, 17.50, 19.50, 21.50, 24.00, 28.00, 30.00, to 60.0 in 5.00 GPH steps and 60.0 to 100.0 in 10.00 GPH steps.

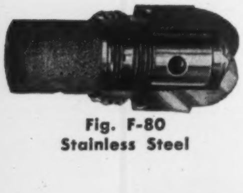


Fig. F-80
Stainless Steel

Write for complete Catalog I and prices

MONARCH MANUFACTURING WORKS, INC.

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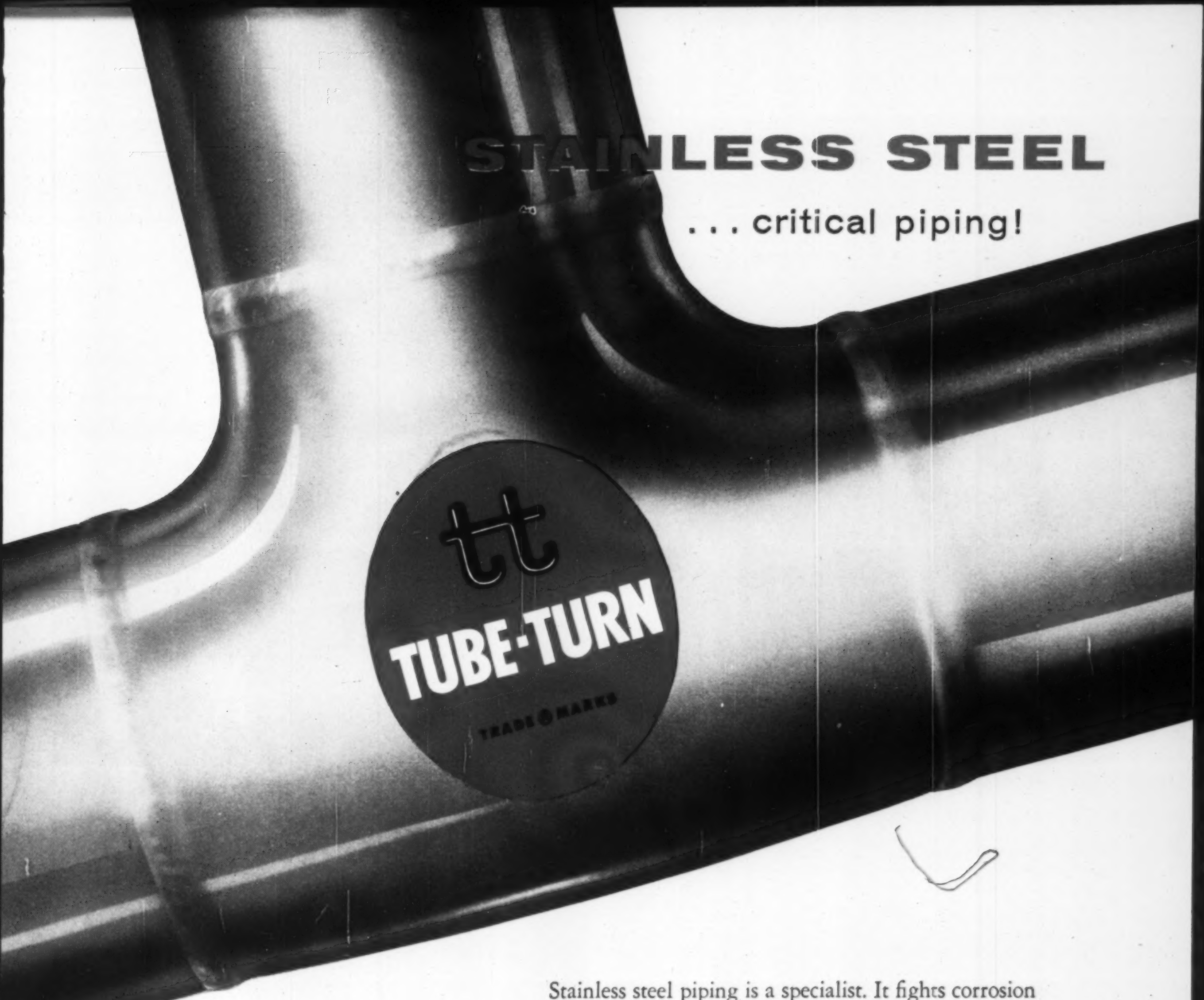
STAINLESS STEEL

. . . critical piping!



. . . a critical place to
safeguard your reputation
with "**TUBE-TURN**" products

Stainless steel piping is a specialist. It fights corrosion . . . prevents product contamination . . . performs under great temperature extremes . . . is able to handle dangerous materials safely. Construction and maintenance dollars, often the safety of life and property, and *your reputation* are at stake in the selection of these materials.

When you specify TUBE-TURN* Stainless Steel Fittings and Flanges, you get extra-value features and greater strength at no extra cost. Fittings are marked with *complete* identification. Production procedures and quality control assure conformity to all code requirements.

Your nearby Tube Turns' Distributor can meet *all* your needs in welding fittings and flanges *promptly*.

*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

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A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Detroit • Atlanta • New Orleans • Houston • Midland
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YOUR SAFEGUARDS

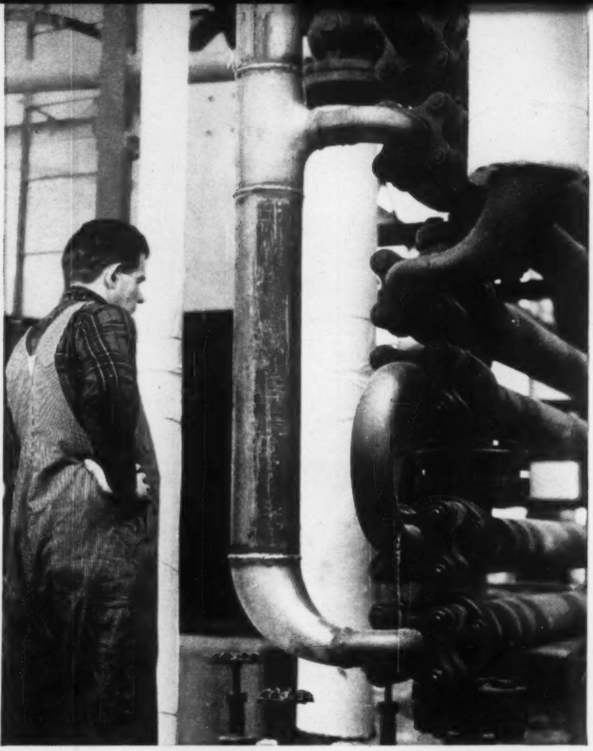
You get these extra values at no extra cost with

TUBE-TURN®

Stainless Steel Fittings

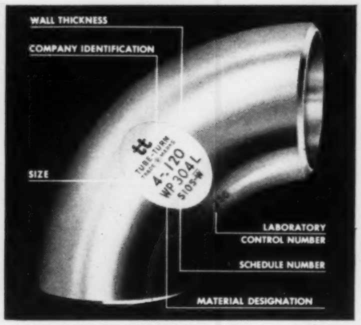
- Fittings meet *all* standard chemistry specifications
- Minimum wall thickness of elbows are at least 87½% of nominal
- All fittings meet calculated bursting pressure of matching pipe
- Qualified welders and procedures used where welding is required
- Each fitting properly solution heat-treated
- Each fitting passivated
- Special grades of stainless steel, and all other alloys available

Meet all codes: ASTM A403 (for material and manufacturing procedure); MSS SP43 and ASA B16.9 (for dimensions); and MSS SP25 (marking procedure).



TUBE-TURN Stainless Steel Elbows and Tee in a petrochemical plant.

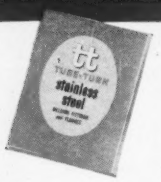
UNIFORM WALL. Fittings meet ASA standards of 87½% of nominal thickness . . . particularly important for light wall elbows. Many conventional stainless steel elbows are as much as 30% to 40% below nominal at this point of greatest wear. All TUBE-TURN* Stainless Steel Fittings, including tees, match calculated bursting strength of the pipe.



COMPLETE IDENTIFICATION. You *know* this fitting conforms to specified quality because the material type and quality control are fully identified. Manufacturer, size, wall thickness and schedule are also marked as shown on the fitting.

CUTS PURCHASING COSTS. You can order TUBE-TURN Stainless Steel Fittings from your nearby Tube Turns' Distributor . . . on the same order as other types of welding fittings in Tube Turns' line of 12,000 products. Cuts red tape. Saves time. Photo courtesy McJunkin Corporation, Charleston, W. Va.

STAINLESS STEEL CATALOG—Complete information on properties, application, standards, welding procedure and all types of TUBE-TURN Stainless Steel Fittings and Flanges. Mail coupon for your free copy.



TUBE TURNS, Dept. A-1
224 East Broadway, Louisville 1, Kentucky
Please send STAINLESS STEEL CATALOG.

Company Name____________________
Company Address____________________
City__________ Zone____ State________
Your Name____________________
Position____________________

Available from your
nearby
TUBE TURNS'
Distributor

*"TUBE-TURN" and "tt"
Reg. U.S. Pat. Off.

TUBE TURNS

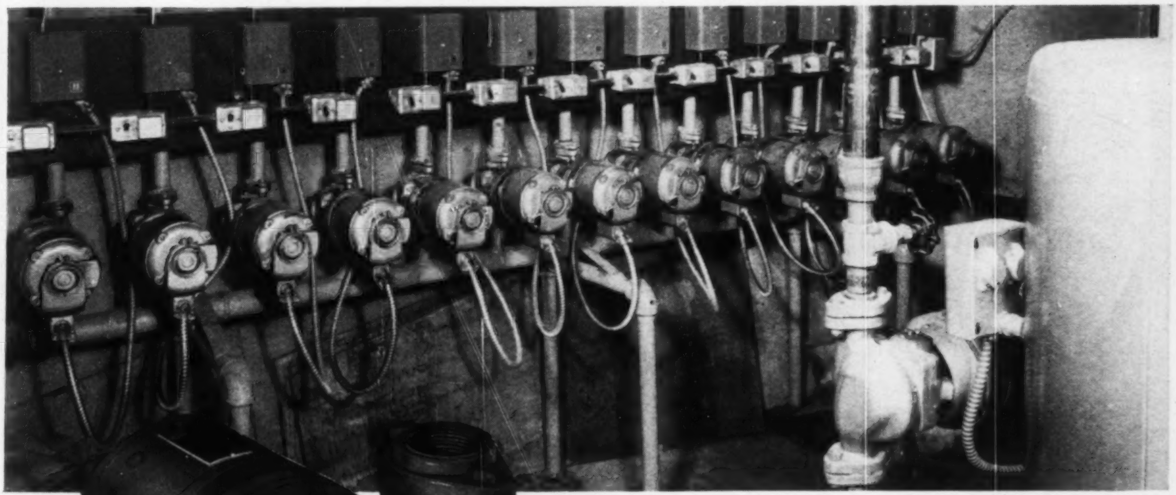
A DIVISION OF NATIONAL CYLINDER GAS COMPANY

LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Detroit • Atlanta • New Orleans • Houston • Midland • Dallas • Tulsa • Kansas City • Denver • Los Angeles • San Francisco • Seattle. **IN CANADA:** Tube Turns of Canada Ltd., Ridgetown, Ontario • Toronto, Ontario • Edmonton, Alberta • Montreal, Quebec • Vancouver, British Columbia.

MOTEL
Tulip City
MOTEL

...FINDS *hydronics** THE ANSWER TO MOTEL HEATING PROBLEM



B&G Hydro-Flo System installation in Tulip City Motel, Holland, Michigan

While motel heating is notoriously difficult because of rambling construction and irregular occupancy, the B&G *Hydro-Flo* System provides a practical and economical solution.

The motel illustrated above was originally heated with individual room space heaters. Two years ago the heating method was completely revamped by installing a B&G *Hydro-Flo* System with baseboards as the heat distributors. Each of the rooms is on a separate zone, served by a thermostatically controlled B&G Booster. The owner reports a great improvement in comfort, with temperatures properly controlled and operating costs low.

The versatility of water as both a heating and cooling medium—its ability to provide the ultimate in comfort and convenience at low cost—its flexibility, offers a sound solution to the comfort problem in every type of residential, commercial and industrial building.

B&G BOOSTER
THE STANDARD OF COMPARISON

The prime requisite of a forced hot water heating pump is *quiet* operation! In this respect the B&G Booster is completely outstanding...in every detail it is designed to eliminate noise.

Motors are specially built units...alloy steel shafts are oversized, affording large bearing surfaces. Extra long sleeve bearings promote smooth, quiet operation and spring-type couplers further dampen noise and vibration. The extremely hard seal positively prohibits water leakage into the bearings.

Hydro-Flo SYSTEM

BELL & GOSSETT
COMPANY

Reg. U.S. Pat. Off.

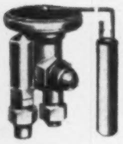
Dept. FC-5, Morton Grove, Ill.

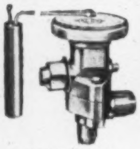
Canadian Licensee: S.A. Armstrong, Ltd., 1400 O'Connor Drive, Toronto 16, Ontario

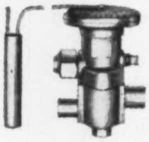
***Hydronics...the science of heating and cooling with water.**

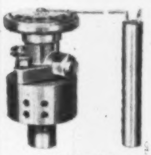
THERMO EXPANSION VALVES

TYPE 402
with pressure limiting feature


TYPE TK
"3 valves in 1"

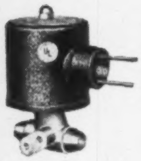

TYPE TCL
with angle connections

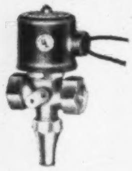

TYPE TCL
with straight-thru connections

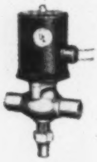

TYPE TR
Multi-Outlet

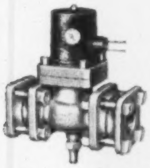
For automatic control of liquid refrigerant on all types of refrigeration and air conditioning systems. Capacities: From fractional tonnage to 200 tons Freon-12 and Freon-22; selective charges. Low temperature valves for -40° F. to -100° F.

SOLENOID VALVES


TYPE S1


TYPE S2


TYPE M3

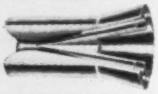

TYPE R2

For all types of service. For liquid: Freon-12 up to 75 tons; 110 tons Freon-22. For suction: Freon-12 up to 10 tons; 15 tons Freon-22. For hot gas discharge, brine, water, steam, air or oil service.

ALCO

THE ONE COMPLETE LINE OF REFRIGERANT CONTROLS

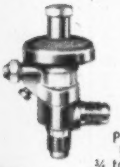
VENTURI-FLO DISTRIBUTORS


Wide application range. One piece; replace distributors requiring as many as 6 or 7 nozzles.

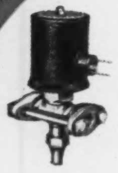
SUCTION LINE CONTROLS

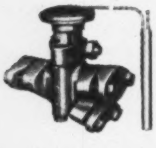
TYPE 771-772
SUCTION PRESSURE REGULATORS
(Hold-Back Valves)
Prevent motor overload.
Freon-12, Freon-22.

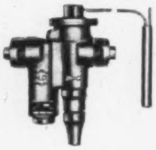
TYPE EPR
EVAPORATOR PRESSURE REGULATORS
For all refrigerants, with connection sizes up to 6".

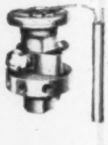

TYPE 760
"EVAPOTROL"
Pressure regulator—
½ ton, Freon-12—
¾ ton, Methyl Chloride.

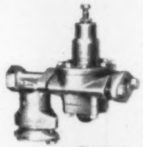
AMMONIA CONTROLS


TYPE M91F


TYPE TG

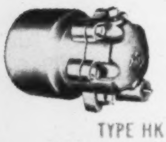

TYPE UG


TYPE TX

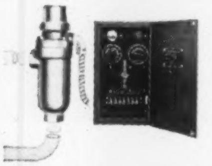

TYPE E
with strainer

Solenoid Liquid Valves—up to 172 tons. Solenoid Suction Valves—up to 28 tons. Thermo Expansion Valves—from fractional tonnage to 125 tons. Automatic Expansion Valves—from fractional tonnage to 60 tons.

FLOAT VALVES AND SWITCHES


TYPE HK
high pressure float valve.
Up to 5 tons Freon-12,
8 tons Freon-22 and
20 tons Ammonia.

TYPE J56
electric float switch.
For Freon, Methyl Chloride, Ammonia and other non-corrosive liquids having a specific gravity of .6 or more. Up to 230 volts AC or DC.


908
LECTRO-LEVEL
electronic remote control of liquid level. Accurate control for full-flooded evaporators. Adjustable to a wide range of level changes. Easy-to-set control dials conveniently mounted in remote box.

7480

For capacities in excess of those listed, write us and give specific requirements.

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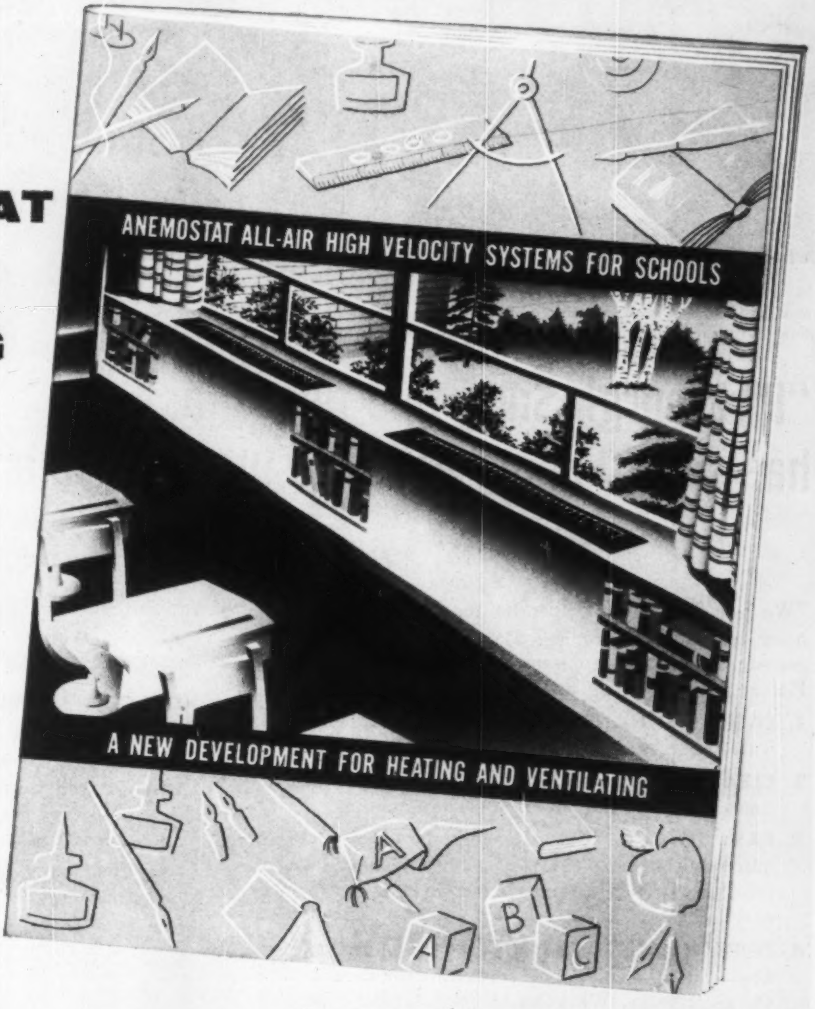
ALCO

ALCO VALVE CO.
861 KINGSLAND AVE. • ST. LOUIS 5, MO.

ALCO ALSO OFFERS YOU Constant Pressure (Automatic) Expansion Valves—Reversing Valves—Liquid and Suction Line Strainers.

Are you building a new school or renovating an old one?


ANEMOSTAT ALL-AIR HIGH VELOCITY SYSTEMS FOR SCHOOLS
A NEW DEVELOPMENT FOR HEATING AND VENTILATING

New ANEMOSTAT SCHOOL CATALOG

contains *necessary* application and selection data

ANEMOSTAT®

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ANEMOSTAT CORPORATION OF AMERICA
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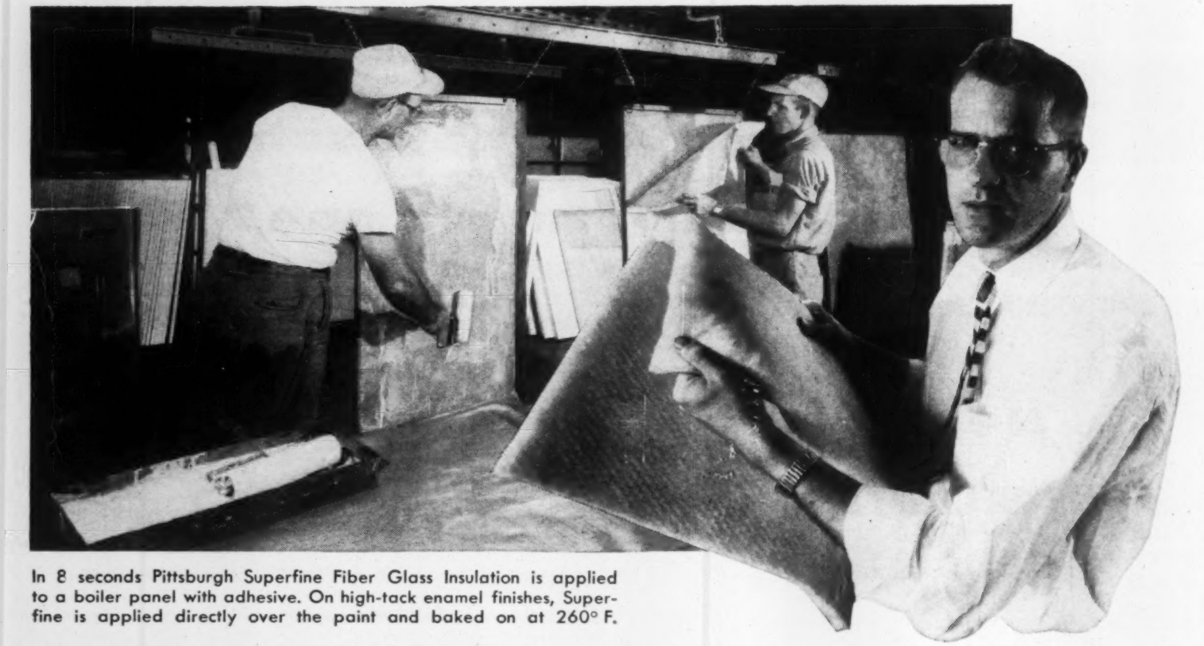
10 E. 39TH STREET, NEW YORK 16, NEW YORK

Gentlemen:

Please send me, without obligation, a copy of your new School Catalog.

Name........................ *Position*..........
Company ....
Address..
City........................ *Zone*...... *State*....



In 8 seconds Pittsburgh Superfine Fiber Glass Insulation is applied to a boiler panel with adhesive. On high-tack enamel finishes, Superfine is applied directly over the paint and baked on at 260° F.

"Pittsburgh Superfine fiber glass has satisfied our boiler insulation demands in every way"

—says Mr. E. J. Renner, Project Engineer,
National-U.S. Radiator Corporation, Duncansville, Pennsylvania

"We use Pittsburgh Superfine to insulate boilers for home and commercial use," says Mr. Renner. "In comparison with the insulating material previously used, Pittsburgh Superfine has given us four advantages:

1. **EASIER TO HANDLE.** "It's lightweight, easier to warehouse, easier to move during manufacturing.
2. **CLEANER.** "Former material came in bags which sometimes broke, making an extra clean-up chore.
3. **EASY TO CUT.** "Cutting Superfine Fiber Glass requires no extensive layout or complicated system. Operator uses a 10-in. kitchen-style knife for this easy job.
4. **SHIPPING COSTS CUT 10%.** "On coal-fired and gas-fired boilers, insulation is applied by the contractor or the distributor. When we shipped former type insulation to them, special wire-bound crates were required. Now we ship Superfine Fiber Glass in cardboard containers and save 10% on shipping costs.

"We use one-inch, half-pound density Superfine to reduce heat loss in the boilers. This insulation is so effective that at normal temperatures—150° F to 212° F—the boiler exterior is only slightly above room temperature. Greater bulk of the other type insulating material would be required to do the same job."

HOW CAN PITTSBURGH SUPERFINE HELP YOU?

Let us show you! We'll be glad to work on your insulation problems with you right in your own plant. For technical assistance, call your nearest PPG Sales Office or write us direct. *Pittsburgh Plate Glass Company, Fiber Glass Division, One Gateway Center, Pittsburgh 22, Pennsylvania.*

Light-weight, easily handled Superfine is quickly cut with kitchen-type knife. Use of Superfine cuts shipping costs 10% on two types of boilers at National-U. S. Radiator.

PITTSBURGH SUPERFINE INSULATION IS A PRODUCT OF PITTSBURGH PLATE GLASS COMPANY

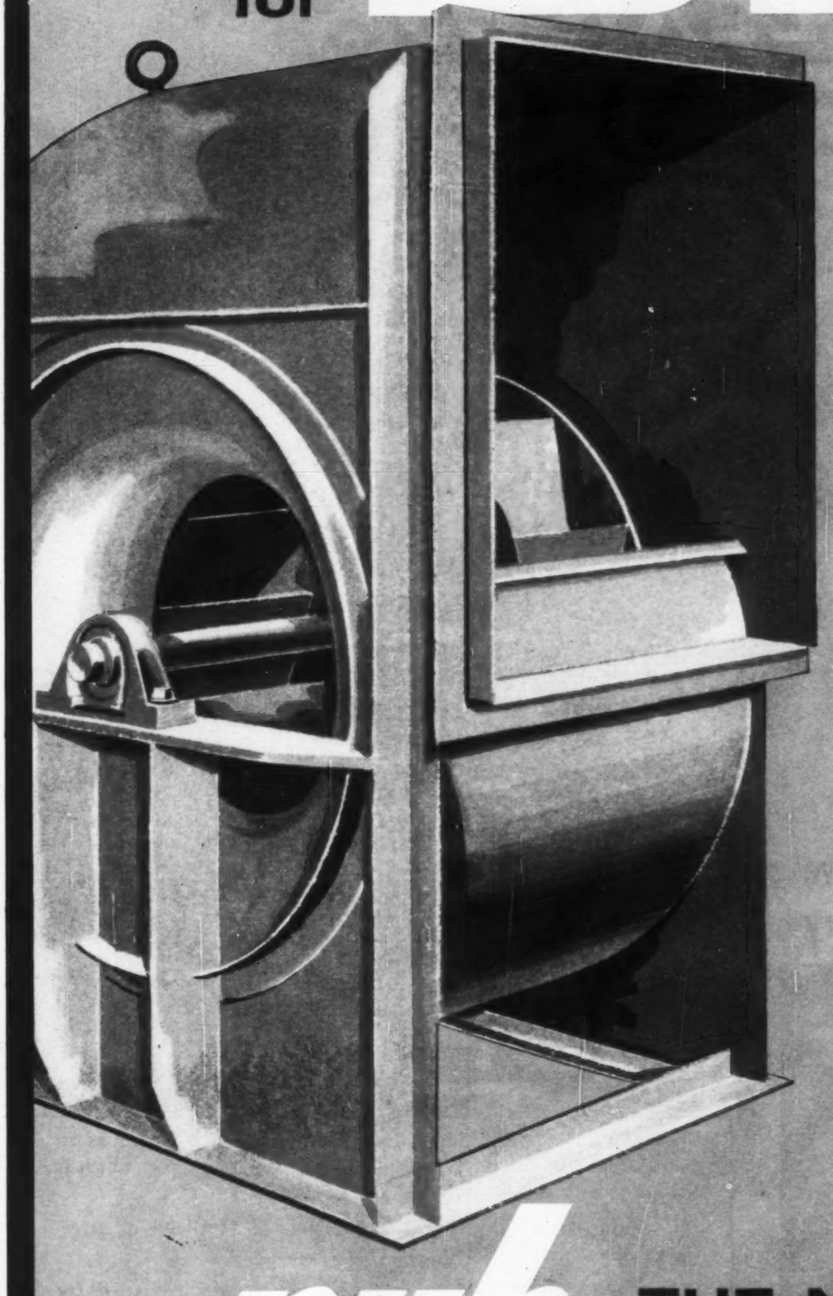
Sales Offices are located in the following cities: Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh and St. Louis

FIBER PPG GLASS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

The BIG year for BIG performance



IPL
(IMPROVED POWER LIMITING)
FANS

. . . for standard duty and heavy industrial use . . .

Present day air handling problems demand BIG performance from fans. The IPL product line gives you that BIG performance because of their adaptability to an extremely wide variety of design requirements over a broad range of applications. You'll find they're extra quiet, compact, non-overloading . . . and available in all standard classes and constructions. Wheel diameters from 15 inch to 73 inch. Make the cost-saving switch now from problems to profits with IPL Fans; write today for bulletins 561 and 572.

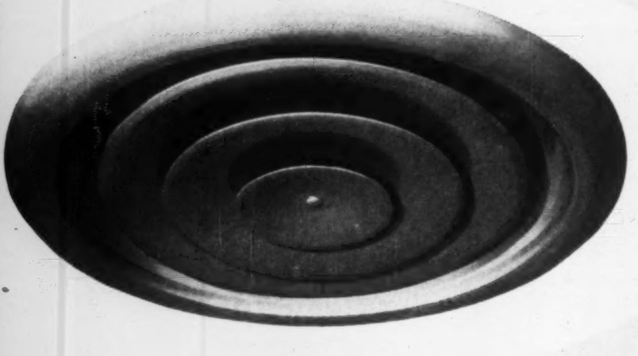
nyb **THE NEW YORK BLOWER COMPANY**

Sales offices: 3149 South Shields Avenue • Chicago 16

Announcing the

NEW FLEXIFLO

TYPE QP



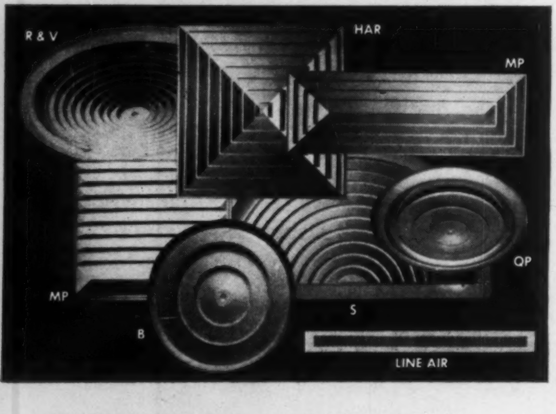
4-CONE
Adjustable Pattern
DIFFUSER

We present the "QP" diffuser for the ultimate in styling and elegance. It's built of the finest materials, and quality-finished for unexcelled appearance and performance.... AND it's priced right!

The "QP" diffuser is made up of 4 spun cones. By rotating the lower blade, the core will move up or down with the consequent change of air delivery pattern from horizontal through any angle to vertically down. The "QP" diffuser can be used equally well for cooling, ventilating and heating. It may be installed either in exposed duct work or flush to the ceiling.

Volume control is obtainable by using any of our three standard FLEXIFLO dampers to meet specific requirements. Get the FACTS on this most advanced design in 4 cone diffusers.

FLEXIFLO — The most extensive line of DIFFUSERS in the industry



R—Cooling, adjustable
V—Heating & Cooling, adjustable
B—Heating & Cooling, fixed
QP—4-cone, adjustable

HAR—Square, adjustable
MP—Rectangular and square
S—Half-round
LINE AIR—Long slot diffuser

PLUS—many other types

The Flexiflo "QP-SR" Supply and Return Diffuser includes, as an integral part of the unit, a face operated volume damper, which is exclusive with Flexiflo.

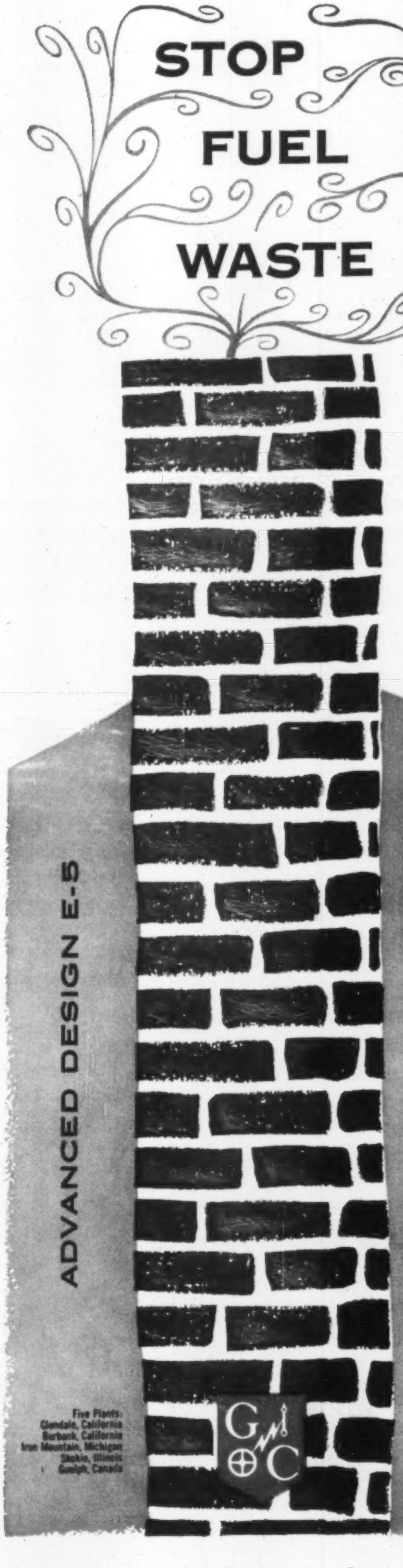
Equalizing deflectors and exhaust dampers are available as accessories upon request.

The "QP-F" Diffuser ("QP-fixed") is a non-adjustable type QP for general application. It has a fixed horizontal pattern for cooling and ventilating.

FLEXIFLO

UNIVERSAL DIFFUSER CORP.
38 Marbledale Road, Tuckahoe, N. Y.
Canadian Representative:
Douglas Engineering Co., Ltd., Montreal and Toronto

STOP FUEL WASTE



...YOU SAVE DOLLARS WHEN YOU INSTALL GENERAL CONTROLS DRAFT CONTROL SYSTEMS!

You stop fuel waste when you install the new General Controls E-5 Draft Control System. You save money with any type boiler . . . any type fuel!

Besides fuel savings up to 25% . . . automatic draft regulation helps you save manpower as well. Even in a one-man boiler room the savings can exceed a thousand dollars in one year! Another benefit: in addition to *money savings* you'll *increase good will by adequate smoke control.*

Ask the General Controls Factory Representative in your area to show you how draft regulation will benefit your installation. Call him in soon.

THIS IS THE GENERAL CONTROLS DRAFT REGULATION SYSTEM...

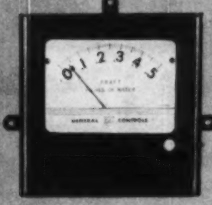
ADVANCED DESIGN E-5

DRAFT-PROGRAM CONTROL...

Master unit programs damper action for start-up and shut-down, plus setting correct damper position for any firing rate. Optionally, it will provide Low Draft Cut-off, Time Delay Cut-off, Adjustable Starting Draft . . . it not only acts fast . . . it's accurate! It even senses changes in atmospheric conditions!

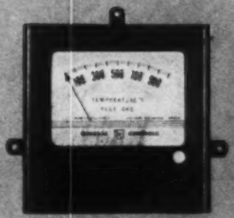
ACTUATOR...

Responding to the commands of the Draft-Program Control, this unit positions uptake damper. Maintains correct draft conditions continuously without attention.



DRAFT GAGE...

Instrument gives continuous visual reading of draft conditions. Operator always knows what is going on . . . no guesswork!



TEMPERATURE GAGE...

Flue gas pyrometer instrument shows efficiency of boiler . . . warns operator of wasteful firebox conditions!

WRITE FOR 1957 CATALOG

Five Plants:
Glendale, California
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Guelph, Canada

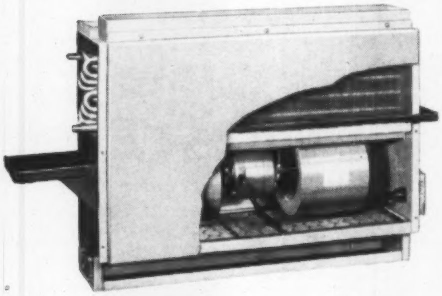
GENERAL CONTROLS

America's Finest Automatic Controls for Home, Industry, and the Military

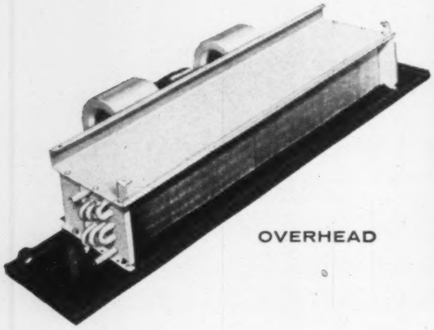
Factory Branch Offices Serving *All* Principal Cities of the United States and Canada

Why those who want the finest in

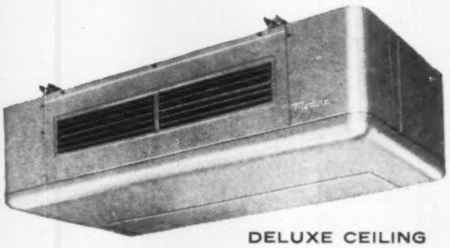
CONSOLE



CONCEALED



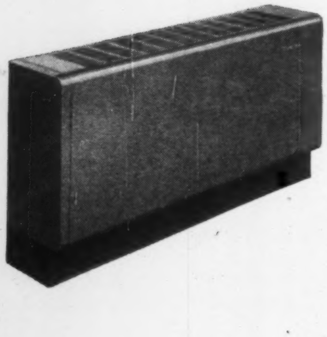
OVERHEAD



DELUXE CEILING

Modine Airditioners®

Popular fan-coil units for cooling with chilled water, heating with hot water—from a central source. For year-round air conditioning in multi-room installations. Offered in console, ceiling and concealed overhead and in-the-wall types. Four sizes range from 2/3 to 2 tons of refrigeration. Ask for Bulletin 757.



Modine CABINET UNITS

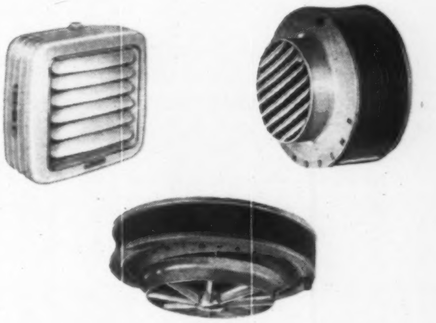
An extremely versatile line of heating and ventilating units providing quiet, positive distribution of heated air with or without ductwork. Models for cooling with chilled water. Seven distinct enclosure types, plus a variety of accessories, permit matching practically any installation or performance requirement. Capacities from 120 to 640 Edr. Write for Catalog 557.

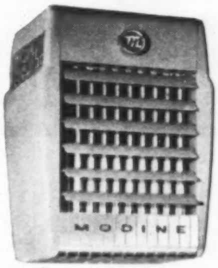
heating and air conditioning say...

make mine Modine

AMONG building professionals and owners, the high quality of Modine heating and air conditioning equipment has long been recognized. Careful examination proves it to be a tangible value which benefits those who specify, install and use Modine products. This quality is a direct result of a company policy which is briefly expressed as follows—

"Modine products, while not premium-priced, are produced to meet those high standards of mechanical construction and performance excellence which long experience has proved essential to complete user satisfaction."



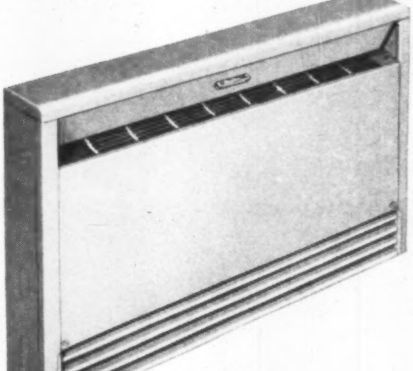


Modine GAS UNIT HEATERS

Beautifully styled units feature light weight for easy, low-cost installation . . . stainless steel burners and stainless or aluminized steel heat exchangers for longer life . . . advanced engineering design for outstanding heating performance. Eight sizes from 25,000 to 310,000 Btu. Catalog 656-A.

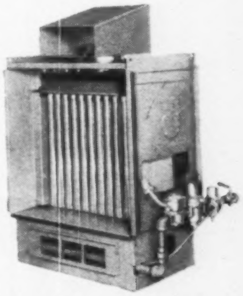
Modine STEAM AND HOT WATER UNIT HEATERS

Widest line available — includes horizontal and vertical delivery types plus Power-Throw models for use where extremely long "throw" is needed. All types are available in HCR models designed for application where severe internal corrosion is a problem. Bulletin 157.



Modine DUCT FURNACES

Ideal for use with cooling package or for straight heating. Stainless steel burner and heat exchanger resist rust and corrosion caused by moisture-laden air or condensation. Five sizes from 88,000 to 213,000 Btu. Bulletin 855.



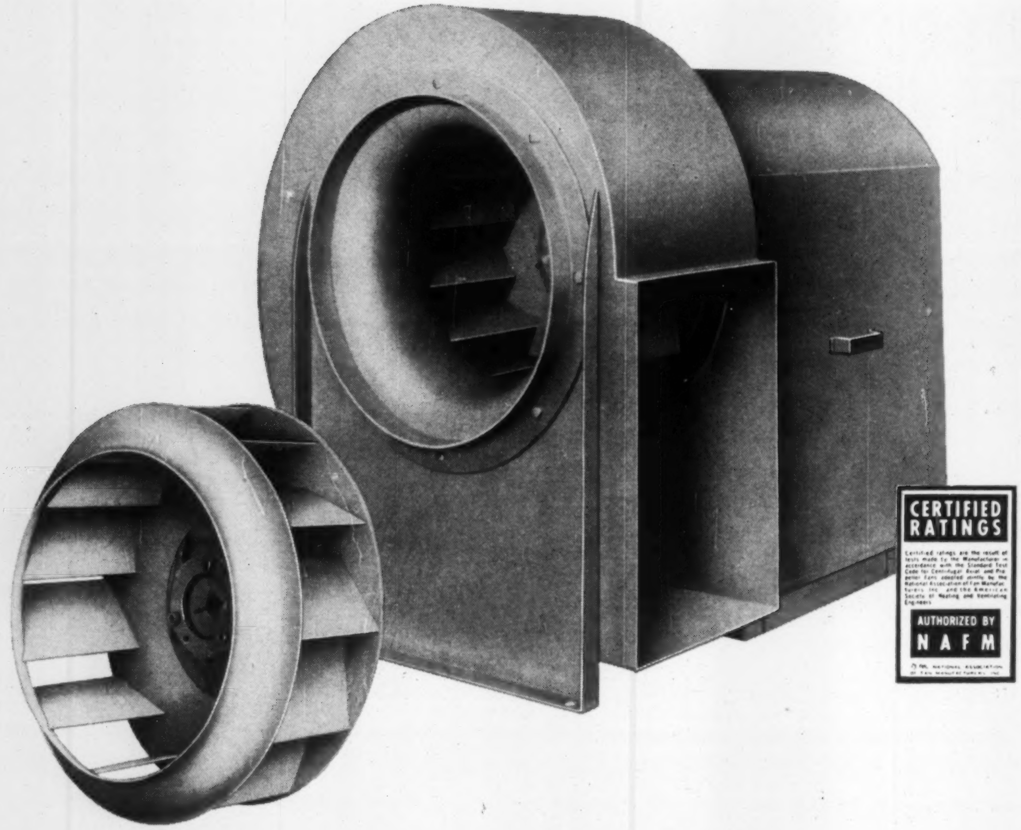
Modine CONVECTORS

Attractive appearance and sturdy construction characterize the Modine line of convector radiation. Offered in 30 types and 8,000 sizes for every building need. Choice of standard or heavy-gauge enclosures. Catalog 257.

Modine
MANUFACTURING COMPANY

1509 DeKoven Ave., Racine, Wis.
In Canada: **Sarco, Ltd., Toronto**

UR-1353

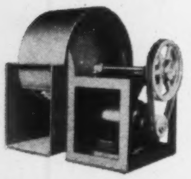


Backward Curve Blowers—Certified Ratings

Completely Designed, Engineered and Manufactured by Peerless Electric

Peerless Backward Curve Blowers are all Peerless—motor and all. We control the entire production of this versatile blower, from drawing board to finished product. We guarantee it unconditionally for quiet, trouble-free operation.

Peerless Backward Curve Blowers can be specified with confidence. They are thoroughly tested according to test codes. They meet NAFM and NEMA standards. Scores of them are operating in schools, churches, hospitals and government installations.

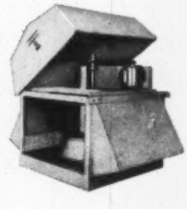


FORWARD CURVE BLOWERS

Made entirely by Peerless; arc-welded housings and frames; wheels designed for quieter operation; dynamically balanced.

CENTRIFUGAL ROOF VENTILATORS

Matching wheel cone accurately fits spun venturi for quieter, smoother air movement. All welded construction; material 16 ga. or over. Each unit air tested, and rated to assure certified PFMA ratings. Fits standard curbs.



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Charter Member of the Air Moving and Conditioning Association

FAN AND BLOWER DIVISION

Peerless® Electric

THE *Peerless Electric*® COMPANY

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Write Today for Bulletins SDA-220, SDA-200 and SDA-160.

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High-Velocity System . . .
High-Quality ULTRALITE
DUCT INSULATION

ULTRALITE, the long glass fiber duct insulation, is the logical choice for high-velocity air conditioning systems where cost and performance are prime considerations. There's a big saving in heat loss (or heat gain) due to ULTRALITE'S superior thermal efficiency. There's a big saving in application cost, too, because blanket rolls of ULTRALITE, with vapor barrier adhered, wrap quickly around ducts of every size and shape . . . and because ULTRALITE'S long-fiber strength makes it easy to secure in place by methods not practical with ordinary glass fiber blankets. It does not tear or lose thickness, and you get a nice looking job without "thin spots", for ULTRALITE always springs back to its original thickness. From every standpoint, ULTRALITE is the *best* duct insulation—yet it costs no more!

FOR COMPLETE INFORMATION ABOUT ULTRALITE DUCT INSULATION AND DUCT LINER, WRITE TODAY FOR SAMPLES AND A.I.A. BULLETINS.

GUSTIN-BACON Mfg. Co. GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings
Molded glass fiber pipe insulation
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We discipline copper.

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We put it through the roaring heat of our own smelter . . . the high-amp stillness of electrolytic refining tanks . . . the irresistible pressures of piercing mills and extrusion presses . . . the long reaches of our drawbenches . . . through coiling, annealing, straightening and testing equipment.

We work our will on copper—through every chemical change, every physical gyration known or needed—to deliver it perfect and enduring, yet submissive . . . as Lewin-Mathes seamless tube, pipe and fittings.

Like the ancient coppersmith, our pride of product is that of the *integrated specialist*. And the Lewin-Mathes nation-wide supply facilities serving you, we believe, are second to none.

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COPPER AND BRASS TUBE PIPE AND ROD
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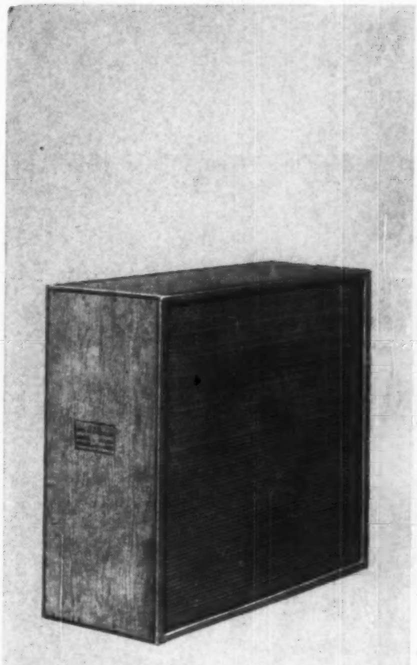
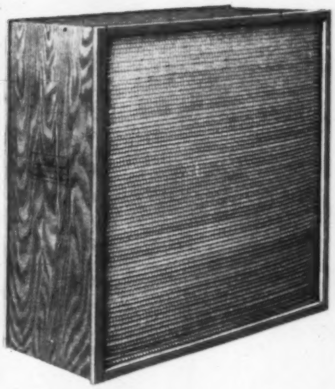
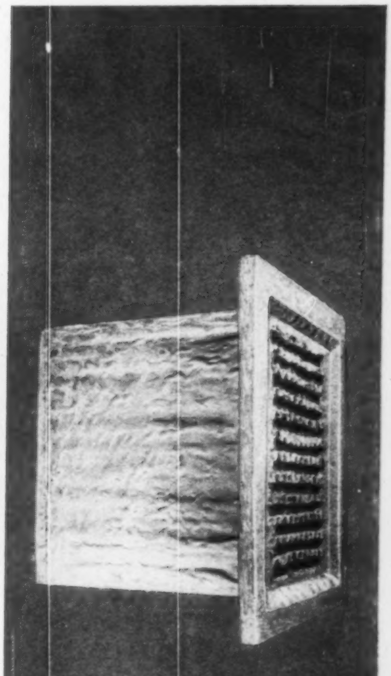


STANDARD MODEL



FIRE RESISTANT MODEL



HIGH TEMPERATURE MODEL

Scientifically tested and registered for the ultimate in AIR PURIFICATION...M-S-A ULTRA-AIRE® SPACE FILTERS

Wherever toxic and radioactive particles or airborne micro-organisms are a threat to health or production processes, M-S-A Ultra-Aire Space Filters offer a dependable, effective safeguard. The high mechanical filtering ability of these units cleans outgoing or incoming air. Result is increased safety or higher product purity in a wide variety of manufacturing operations.

STANDARD MODEL—Conforming to Atomic Energy Commission and Chemical Corps specifications, the standard M-S-A Ultra-Aire Space Filters have a rated retention efficiency of 99.97% on the standard military D.O.P. penetration test. We test every filter against a standard D.O.P. smoke concentration (particle size of 0.3 micron diameter) and initial penetration cannot exceed 0.3% at rated flow. Penetration decreases as the filter is loaded during use. Available in four standard filter frame dimensions.

FIRE RESISTANT MODEL—This model is similar in appearance and size to the four Standard Models. Fire resistant materials have replaced the combustible materials. The combustibles at normal flame temperature (1500°F) have been reduced so that the fuel content in the 1000 cfm size is less than 2 pounds total weight. Plywood frame is impregnated with a fire resistant compound. Filter core consists of impregnated mineral fiber separators and glass fiber web that are both fire and waterproof. Gaskets are fireproof mineral fiber that seal tight at installation.

HIGH TEMPERATURE MODEL—You get effective performance at temperatures up to 1000°F with this model. It provides dependable, safe and efficient filtering of high temperature gases. The filter frame as well as the core is made from glass or other mineral fibers. All combustible materials have been replaced by materials which resist fires, most chemical attack, expansion, contraction and aging. It is tested in the same manner and is as efficient as the Standard model. Initial resistance is 0.9" water gage or less at rated capacity of 50 cfm. Chemical resistance equals glass. And in pharmaceutical applications, it can be dry steam sterilized while in place. *Write us for further information.*

MSA
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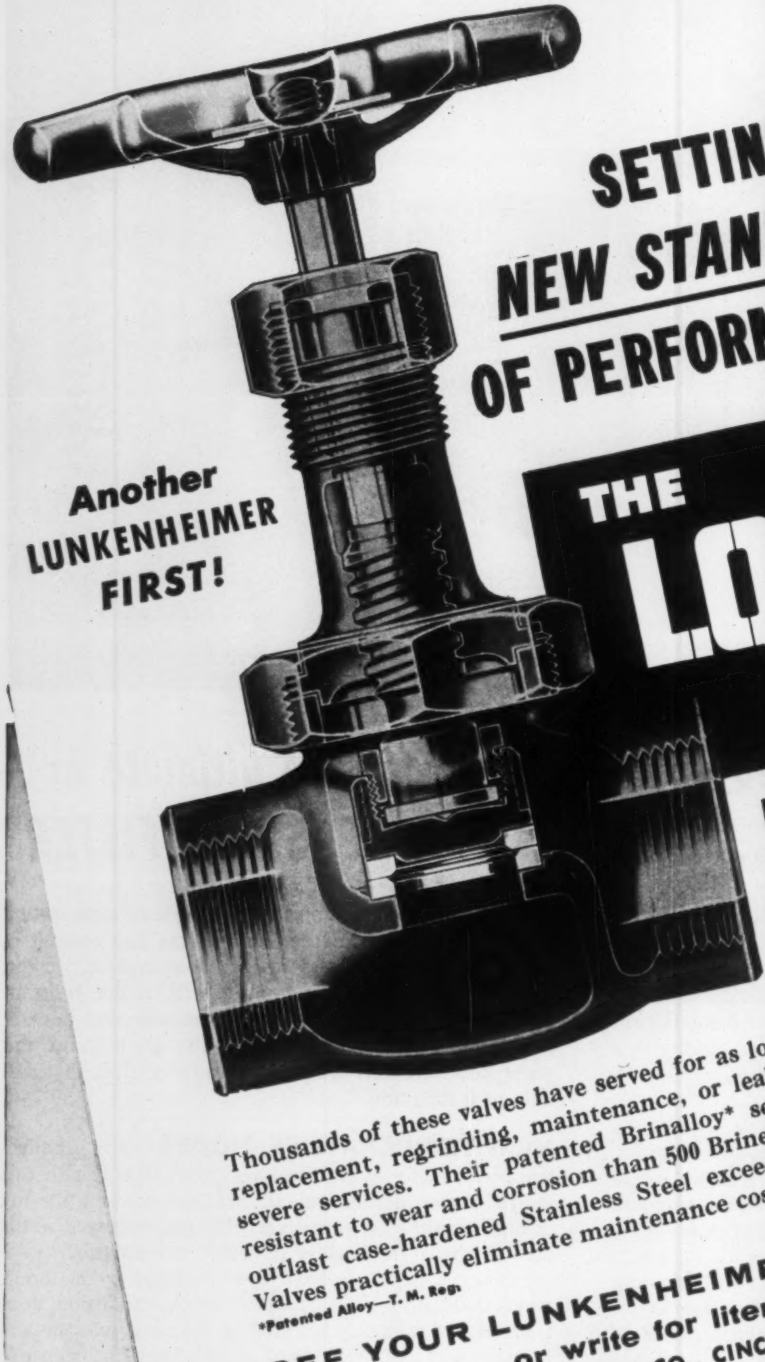

SETTING NEW STANDARDS OF PERFORMANCE...

Another LUNKENHEIMER FIRST!

THE LQ600 VALVE

FIG. LQ600-200

200 lb. S.P.—400 lb. W.O.G.
550° F.

FIG. LQ600-150

150 lb. S.P.—300 lb. W.O.G.

¼ to 2 inches

Thousands of these valves have served for as long as five years without replacement, regrinding, maintenance, or leakage—even on the most severe services. Their patented Brinalloy* seats and discs are more resistant to wear and corrosion than 500 Brinell Stainless Steel . . . even outlast case-hardened Stainless Steel exceeding 1000 Brinell. LQ600 Valves practically eliminate maintenance costs!

*Patented Alloy—T. M. Reg.

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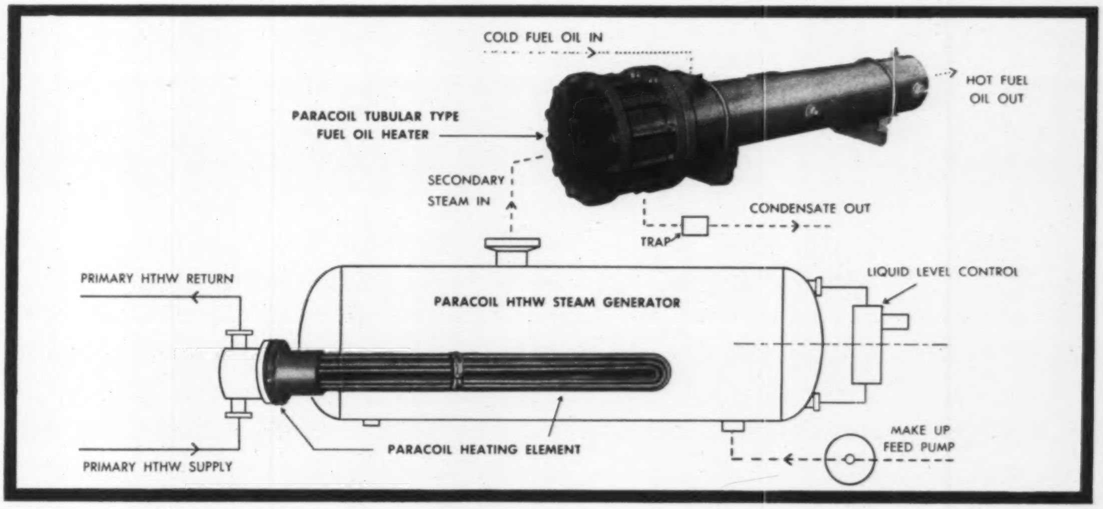
THE ONE *Great* NAME IN VALVES

L-456-28

CUT ALONG DOTTED LINE AND SAVE

Idea no. 1 from Paracoil


COLD FUEL OIL IN
HOT FUEL OIL OUT
PARACOIL TUBULAR TYPE FUEL OIL HEATER
SECONDARY STEAM IN
CONDENSATE OUT
TRAP
PRIMARY HTHW RETURN
PARACOIL HTHW STEAM GENERATOR
LIQUID LEVEL CONTROL
PARACOIL HEATING ELEMENT
MAKE UP FEED PUMP
PRIMARY HTHW SUPPLY

How to use secondary steam to pre-heat no.6 oil in a High Temperature Hot Water system

Paracoil engineers know that the first consideration in the design of an oil preheating system for an HTHW installation must be absolute freedom from the possibility of oil leak contamination of the main HTHW stream. A completely isolated oil preheater circuit is recommended. This can be accomplished by means of a secondary heat transfer circuit that does the actual heating. In this way, only the secondary circuit is exposed to possible contamination — the main HTHW circuit is protected at all times.

One of the ways that this isolation is achieved is illustrated above. Additional isolation circuits will be commented upon in future "Idea Sheets". Watch for them!

How to design a protective circuit

1. **Install a steam generator.** Use a Paracoil Heating Element with the HTHW main energy stream as its heat source. With water at 350° F, steam at 25 psig (267° F) can be easily generated in an economically sized unit.
2. **Use the steam thus generated** . . . to heat the fuel oil in a Paracoil Tubular Oil-Type Fuel Oil Heater.* This type heater provides the highest rate of heat transfer — more than **three times** that of the conventional straight tube type.
3. **The condensate from the oil heater** . . . may be returned to the steam generator or sent to waste depending upon plant policy. If the re-use of the condensate is important, absolute surety of its quality can be obtained through the use of the Paracoil Oil Leak Condensate Inspection System.*

Paracoil engineers have designed and built many oil preheater protective systems for both stationary and marine installations. They now offer their experience and know-how to all who are involved in HTHW activities. ***Write for complete data.**

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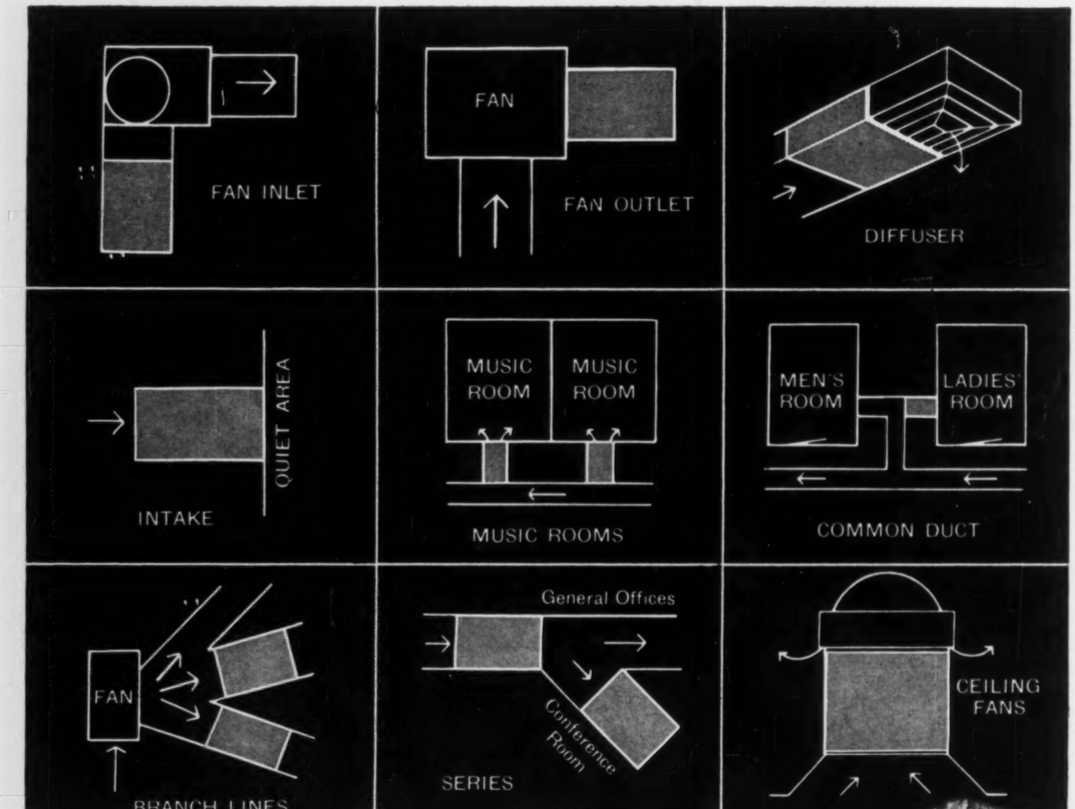
FAN INLET
FAN
FAN OUTLET
DIFFUSER
QUIET AREA
INTAKE
MUSIC ROOM
MUSIC ROOM
MUSIC ROOMS
MEN'S ROOM
LADIES' ROOM
COMMON DUCT
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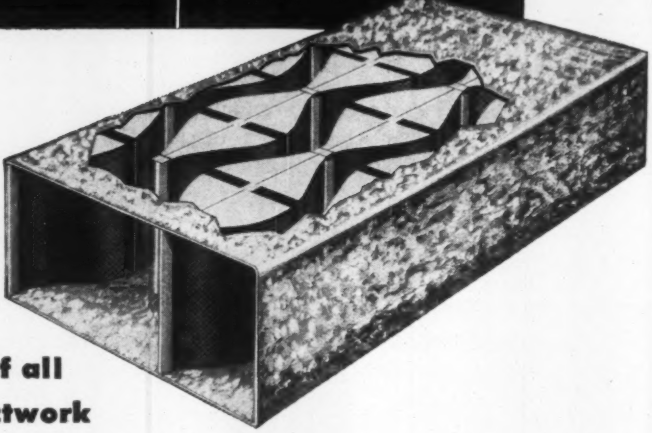
Conference Room
SERIES
CEILING FANS



Every Building Needs Aircoustat Sound Traps

AIRCOUSTAT silences all noise of all frequencies traveling through ductwork

Eliminate disturbance, distraction and irritation caused by noises escaping from one area to another through ductwork.

Install AIRCOUSTAT Sound Traps. AIRCOUSTAT eliminates guesswork, wasted space and unnecessary expense of duct lining. You can guarantee your client trouble-free performance. You can estimate with complete confidence the performance of particular applications. If AIRCOUSTAT fits geometrically, it fits acoustically.

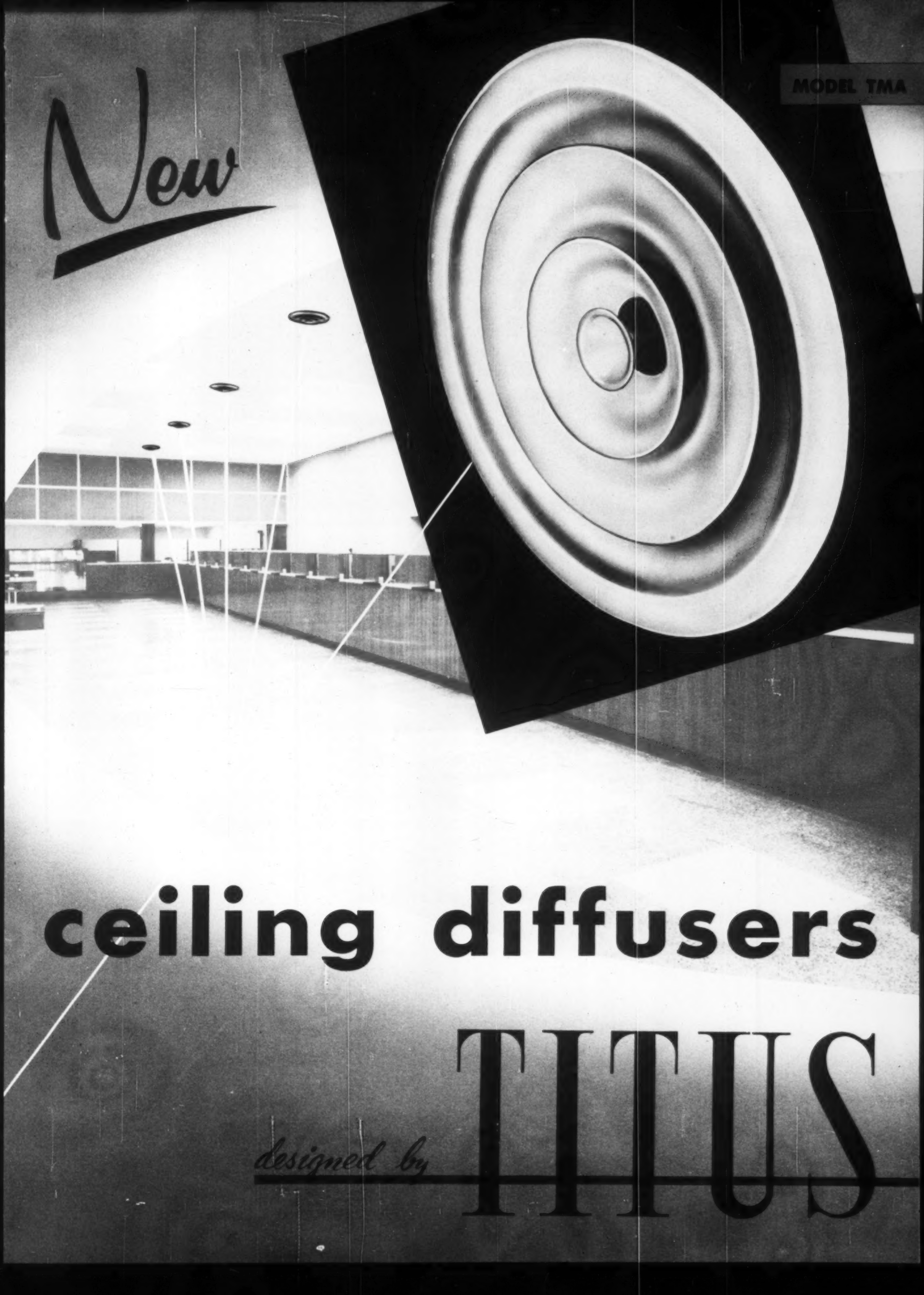
AIRCOUSTAT saves you space. Its greater effectiveness permits smaller-sized ducting. It eliminates bulky mufflers.

For more details, write to KOPPERS COMPANY, INC., Industrial Sound Control Dept., 6201 Scott Street, Baltimore 3, Md.

KOPPERS

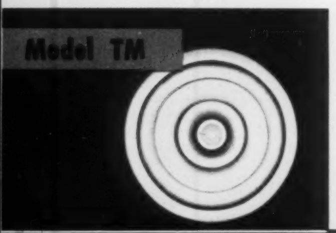
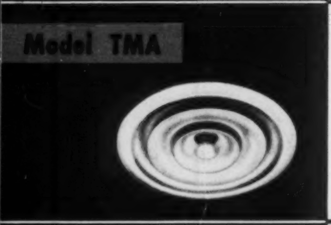
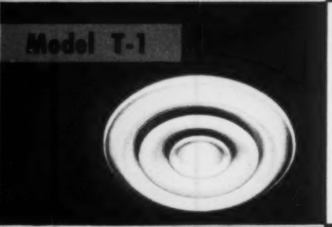
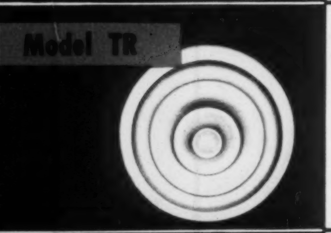
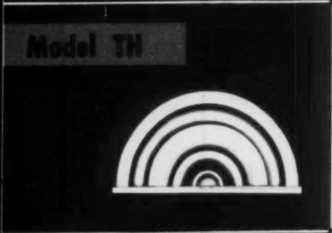
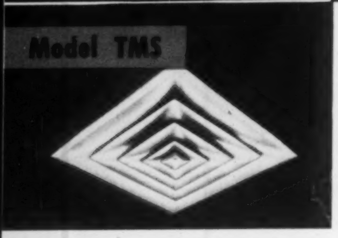
INDUSTRIAL SOUND CONTROL

Engineered* Products Sold with *Service


New
MODEL TMA
ceiling diffusers
designed by TITUS

TITUS CEILING DIFFUSERS

. . . all types . . . in all sizes

STYLE	SIZES	APPLICATION	DESCRIPTION
Model TM 	6" 16" 8" 18" 10" 20" 12" 24" 14" 30" 36"	For exposed ductwork or flush mounting	A fixed cone ceiling outlet with exclusive Titus curved contour cone construction. 4 cones. Ingenious spring lock arrangement permits quick, easy removal or installation of inner cone assembly. Inner cone assembly adjustable at factory or on job to 3 different air patterns — vertical, horizontal, or intermediate.
Model TMA 	6" 16" 8" 18" 10" 20" 12" 24" 14" 30" 36"	For exposed ductwork or flush mounting	A fully adjustable outlet with Titus curved contour cone construction. Simply turn small center cone to adjust to any air pattern desired for any heating or cooling application. 3 center cones move in unison, retaining same relative position for maximum uniformity of design, minimum pressure loss. Inner cone assembly quickly, easily removed.
Model T-1 	6" 14" 8" 16" 10" 18" 12" 20" 24"	For exposed ductwork or flush mounting	A 3-cone supply outlet that combines economy with excellent diffusion performance. Inner cone assembly removes for fast, easy installation. Adjustable — on the job — to 2 air patterns by simply changing screws on inner cone assembly. Heavy-duty sponge gasket around outer edge of diffuser assures air-tight installations.
Model TR 	8" 18" 10" 20" 12" 24" 14" 30" 16" 36"	For exposed ductwork or flush mounting	A combination air supply and exhaust diffuser for heating, ventilating and cooling. Especially designed for use where simplification of ductwork is desirable.
Model TH 	6" 14" 8" 16" 10" 18" 12" 20"	Primarily for ceiling application but can also be used on sidewall.	A half round supply air diffuser with removable inner cone assembly for quick, easy mounting. Adjustable — on the job — by simply removing inner cone assembly and adjusting screws to air pattern desired. Equally efficient for heating, cooling, ventilating.
Model TMS 	4" 12" 5" 14" 6" 15" 8" 16" 10" 18"	For exposed ductwork or flush mounting.	A square diffuser designed to deliver supply air for heating, ventilating, cooling in a 360° pattern. Blank-off baffles available to supply a wide variety of other air distribution patterns. Ingenious spring lock arrangement permits quick, easy removal and installation of inner assembly.

- Also available but not pictured is TITUS Model TL CEILING DIFFUSER (supply air diffuser combined with attractive lighting fixture). Write for literature

TITUS CEILING DIFFUSERS ARE:

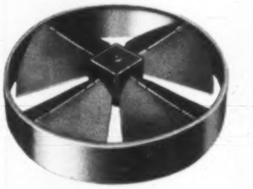
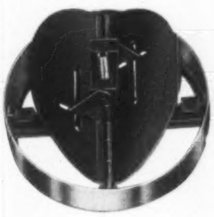
A. Furnished in beautiful metalescent aluminum finish. (Unless otherwise specified)

B. Individually packaged in sturdy damage-proof cartons.

TITUS

ACCESSORIES

. . . to fit every need

	USE WITH MODEL:	DESCRIPTION
 MODEL AG-65 COMBINATION DAMPER AND GRID	TM TMS TMA T-I TL	A combination equalizing grid and damper that is quickly, easily installed in take-off. Blade opens up directly into air stream permitting precision air volume control. Installs flush with duct take-off.
 **MODEL AG-75** RADIAL DEFLECTOR DAMPER	TM TMS TMA T-I TL	Four sets of gang-operated blades distribute air evenly over diffuser or duct — completely eliminating need for equalizing grids. Unique design permits the precision metering of air flow to any degree desired from full open to complete shut-off. Heavy gauge, vibration-free metal blades hold desired settings in spite of air pressure variations. Quickly, easily adjustable from face of diffuser.
 **MODEL AG-85** BUTTERFLY DAMPER	TM TMS TMA T-I TL	A butterfly damper that provides the ultimate in simple, easy, economical control of air volume. Friction pivots on heavy gauge metal blades keep blades at desired setting. Can be mounted directly on diffuser. Fully adjustable from face of diffuser.
 MODEL AG-85S SUPPLY DAMPER	TR	A circular type supply damper used to distribute supply air uniformly around circumference of Titus TR combination supply and return diffuser. Also used to control volume of supply air when balancing system — and as a method for baffling unit to give correct air distribution in irregular spaces. Individually adjustable blades have friction pivots to keem them at desired settings.
 MODEL AG-85R EXHAUST DAMPER	TR	A butterfly type damper used on Titus TR combination supply and return diffusers. Easily and effectively controls volume of return air when balancing the system. Heavy gauge metal blades have friction pivots to maintain desired settings.
 MODEL EG EQUALIZING GRID	TM TMS TMA T-I TL	Used to equalize the flow of air into the neck of diffuser or duct — and to give directional control of air flow whenever needed. Features famous Titus solid metal Airfoil louvers designed to give maximum air control with minimum noise and turbulence. Individually adjustable louvers spring-tensioned to rigidly maintain desired settings — and provide silent, rattle-free performance.
 MODEL CC CEILING CONE (Pictured with Model TMA Diffuser)	TM TR TMA TL	An attractively styled, scientifically designed accessory that not only affords maximum protection to ceiling — but actually enhances appearance of diffuser unit used with it. Adapts Titus diffusers to flush mounting on exposed ductwork — or flush with ceiling.
 MODEL PMR PLASTER MOUNTING RING	TM T-I TMA TR TL	An ingenious combination plaster mounting ring and duct ring that greatly reduces cost, time, work of flush mounting. Fastens by neck to duct and serves as plaster stop. Automatically provides correct ceiling opening and centers diffuser to it. Eliminates cutting hole in plaster. Does away with extra duct-work — extra connections. Sturdy metal construction.
MODEL AG-75½ VOLUME CONTROLLER	TH	An opposed acting damper that serves as an air flow equalizer — as well as a volume control. Positive shut-off when desired.
DUCT RING	TM TR TMA T-I TL	Made of heavy gauge steel. Available for exposed duct work and other applications.
SECTORIZING BAFFLES	Specify side for baffle.	Blanking baffles available for special applications.

. . . and don't forget

TITUS' COMPLETE LINE of AMERICA'S FINEST

GRILLES and REGISTERS

- SUPPLY GRILLES and REGISTERS
- RETURN AIR GRILLES and REGISTERS
- SIDEWALL and CEILING GRILLES
- DOOR GRILLES
- CONVECTOR GRILLES
- GYMNASIUM GRILLES
- LINEAR TYPE GRILLES
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- ALL PURPOSE FRAMES
- PERIMETER DIFFUSERS
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Specify TITUS the complete line

TITUS MFG. CORP. — WATERLOO, IOWA

LITHO U. S. A.

Every bearing noise tested
Designed for low noise level

Not even a whisper . . .

Louis Allis motors "hush" air conditioning systems

Cool and quiet . . . ideal for library concentration. And you can assure this combination when you include Louis Allis motors with the built-in "hush" in your air-conditioning equipment.

This silence is golden — for you and your customers. It's vital to systems for hotels, motels, hospitals, and other institutions where quiet comfort is a "must" . . . in offices for increasing employee efficiency.

You'll find that Louis Allis motors are specifically designed for quiet air-conditioning performance. All parts are skillfully made and precisely balanced for silent, vibration-free operation. Housings, bearings, and end brackets are thoroughly tested for quietness. The result: silence — no disturbing resonance during the operation cycle. Part-winding motors are available to reduce starting currents to meet power company requirements.

For more information on this all-important "silent partner" in your air-conditioning business, contact your nearby Louis Allis District Office or write The Louis Allis Co., 453 E. Stewart Street, Milwaukee 1, Wisconsin. Ask for our file-size Bulletin No. 1700.

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Three New Ways to

SAVE WATER

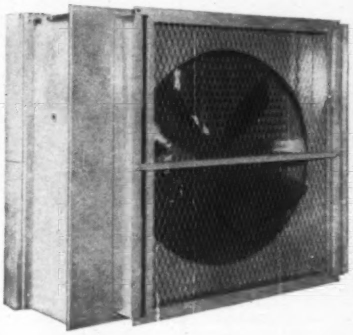
on air conditioning and refrigeration systems of 2 to 250 tons capacity ...and larger

Three new Carrier refrigerant condensers are shown on the page at the right—two of them air cooled and one evaporative cooled. Which will save the most money for your customer? That depends on the job—how big it is, what service it is designed to perform, and the conditions under which it will operate. But whichever you select, each will provide unique advantages. For complete information on these advanced new products and their application to your jobs, call the Carrier dealer listed in your Classified Telephone Directory or write Carrier Corporation, Syracuse, New York.

Carrier **air conditioning · refrigeration · industrial heating**

1

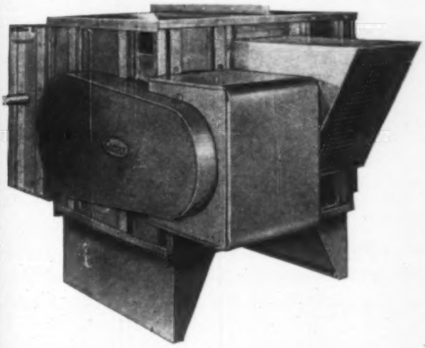
Model 9A Air Cooled Condensers for economy, light weight and compactness



Extremely flexible in application. Indoor or outdoor installation. Loads from 7½ tons to 45 tons handled by one of 10 basic sizes available. For larger loads—up to 540 tons—as many as a dozen of the basic units may be combined into a single condensing system with multiple circuits to serve varied air conditioning and refrigeration requirements. Units feature copper coils with aluminum fins, and an aluminum propeller fan housed in an integral aluminum casing. Model 9A units condense Refrigerants 12, 22 and 500 with equal efficiency.

2

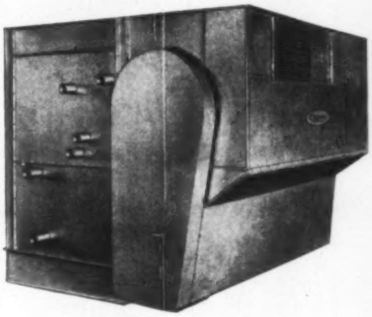
Model 9M Air Cooled Condensers for extra quietness or use with ducts



Provide high-capacity performance in limited space because of special coil and centrifugal fan. In seven low-silhouette sizes, with capacities from 2 to 38 tons. Special coil, with 14 aluminum fins per inch of tubing, packs more heat transfer into less space. Quiet centrifugal fan has ample power to draw air through ductwork, makes the 9M ideal for indoor installation for air conditioning. Offers vertical or horizontal air delivery indoors; horizontal only outdoors. Can be floor or ceiling mounted. Condenses Refrigerants 12, 22 and 500.

3

Model 9H Evaporative Condensers for peak efficiency under all conditions



Greatly improved in design, with exclusive new water distribution method that requires no spray nozzles or eliminators. Water is pumped to a pan at top of unit. Orifice holes in pan meter water evenly into a perforated lower pan, which breaks water into droplets that drench coil. Powerful centrifugal fans draw air quietly across coil, provide peak performance in all air conditioning and refrigeration applications. Units are lighter, lower, easier to service. In 13 sizes, 5 to 250 tons capacity. Condense all types of commercial refrigerants.

Modernize your v-belt drives with

TAPER-LOCK SHEAVES

—proved in over a million installations!

- No flange. No collar. *It's different.*
- Easy on — easy off.
- Just tighten the screws that wedge the bushing. Simple, isn't it?
- Always a perfect fit on shaft — tight as "shrunk-on."
- Complete range of sizes. A, B, C and D grooves, in *stock*.
- Try it—and you'll standardize on it!

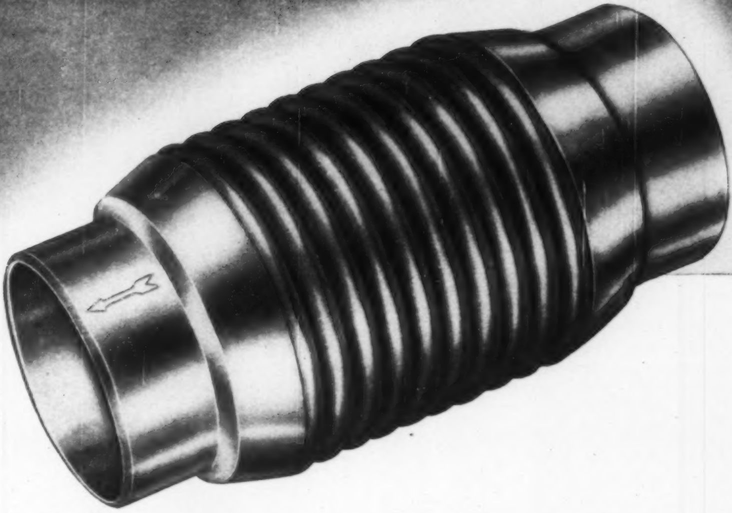
Taper-Lock Sheaves, with their precision machining, team up with matched Sealed-Life V-Belts to insure steady performance and unusually long belt life.

DODGE MANUFACTURING CORPORATION, 1600 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.

New MULTI-PLY EXPANSION JOINT gives greater ELASTICITY



Here's an expansion joint that's really different—it's the BOA expansion joint with the exclusive patented multi-ply corrugated element. Its greater elasticity, flexibility and longer life is the result of the superior cold-forming properties of extremely light-gage stainless steel strip. This "layer on layer" construction of the corrugated element resulting in low reaction to mechanical forces, permits greater responsiveness to expansion and contraction.

For your next piping job, investigate this superior product and see for yourself.

Write today for detailed and descriptive literature.

SIZES

The BOA multi-ply is made in standard sizes ranging from 1 ½" to 24" for pressures to 400 psi. Others specially engineered for higher pressures and temperatures.

Exclusive

TERRITORIES

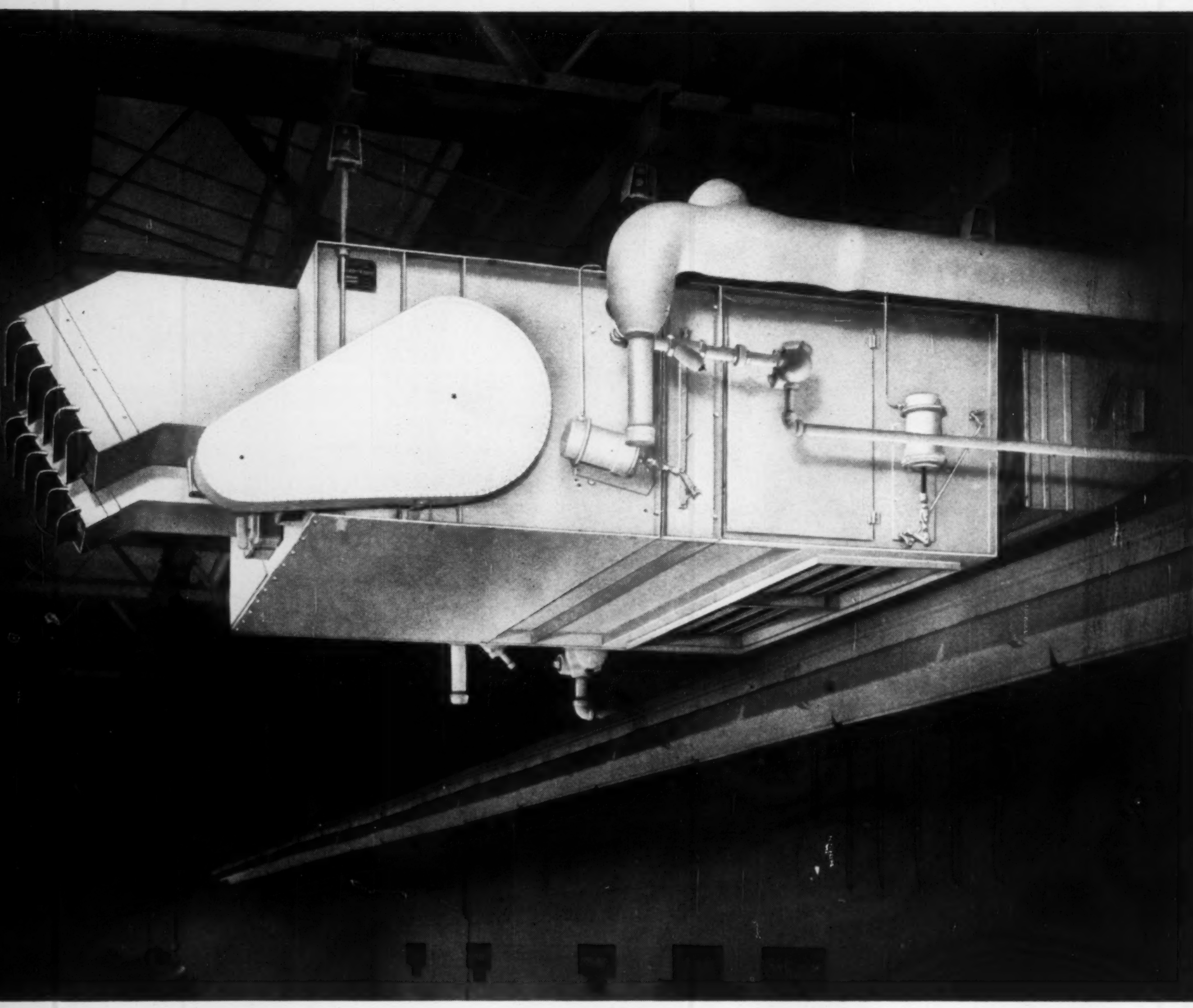
If you are a manufacturer's agent — ask us about some of the exclusive territories still open.

498

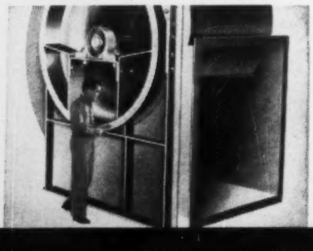
AMERICAN BOA multi-ply INCORPORATED

114 Liberty Street
New York, N. Y.

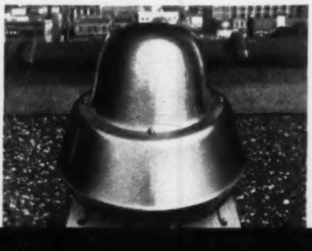
Wherever there's air there's Trane equipment



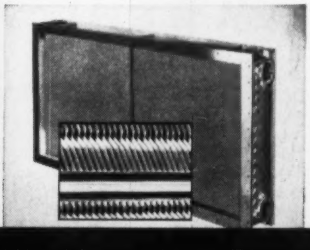
For high-pressure air conditioning systems . . . industrial processing and drying . . . TRANE Class III Fans save space, cut power costs. Complete range of 15 standard sizes from 18 to 73 inches, for static pressures up to 11½ inches. Capacities to 310,000 cfm. TRANE Fans are tested and rated under the NAFM code.



For ventilation . . . the new TRANE Centrifugal Roof Ventilator comes in 16 sizes, all with certified power ratings. All-new design with scientifically contoured inlet cone gives greater efficiency, more cfm with less power. Fan sizes from 7" to 40" wheel; streamlined, compact; shipped fully assembled, ready to install.



For built-up systems . . . TRANE Coils have exclusive Delta Flo Fin (inset) that eliminates stagnant air next to fin surface, increases heat transfer capacity. More efficient fins permit wider spacing for easier cleaning, reduced maintenance. Mechanical fin-to-tube bond is as strong as the metal itself!



to heat or move, to do the job

One source, one responsibility for every factory heating, ventilating need!

Now you can pinpoint responsibility for all your factory heating, ventilating needs with the complete TRANE line of *matched* equipment! That means you order from one reliable source . . . simplify purchasing, operation and maintenance.

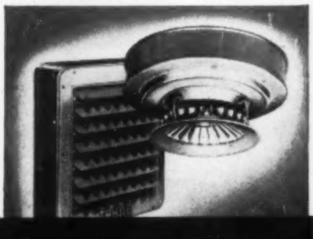
And now, the TRANE lines are more versatile, more complete than ever before! New Centrifugal Roof Ventilators . . . new Cabinet Fans . . . new Torrivent . . . new Steam Specialties . . . a wider range of sizes and models give you everything you need to handle *any* factory ventilating or heating job.

So when you plan, remember that TRANE equipment is *matched* equipment: designed and built together to work together! Whether it's a unit heater for a doorway or equipment for a complete heating-ventilating system, TRANE product lines are complete in every respect.

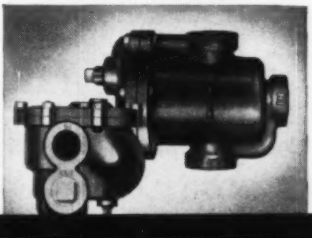
WANT MORE FACTS? Ask your nearby TRANE Sales Office or write TRANE, La Crosse, Wisconsin.

◀ **Heat and ventilate** large areas with the modern TRANE Torrivent. Unit shown is installed in a garage, where it supplies fresh air and heat. Rugged and dependable, the Torrivent is installed with a fresh air intake duct, combination filter and mixing box so that it can supply any desired mixture of fresh and recirculated air—or recirculated air only, as needed. Note the pneumatically controlled face and by-pass dampers for tempering air . . . vibration isolators . . . standard 30° discharge nozzle with directional louvers. Unit shown is installed with TRANE Steam Specialties. Torrivents available in 9 sizes, capacities from 1,250 to 33,000 cfm.

For spot heating . . . TRANE Unit Heaters steer heat in any direction, any proportions, even *different* directions, proportions at the same time! Projection Unit (right) has Louver Cone Diffuser that gives up to 60% more throw. Horizontal Unit (left) has Louver Fin Diffuser for blanketing or spot throw.



To save fuel, stop waste, protect equipment . . . the complete line of TRANE Steam Specialties includes bucket traps, strainers, F and T Traps—plus vents and valves for all kinds of heating or process applications. TRANE equipment is *matched* equipment—designed and built together, to work together!



For any air condition, turn to

TRANE

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WIS. • SCRANTON MFG. DIV., SCRANTON, PA.
TRANE COMPANY OF CANADA, LTD., TORONTO • 96 U.S. AND 19 CANADIAN OFFICES

ROBVON

BACKING RINGS

Patent Nos.
Type C Reg Pat
No. 2,366,579
Type CC & CCC Reg Pat. No. 2,764,426

Designed to meet the most exacting specifications.

Designed to furnish the most highly efficient welded joint possible and to pass the most critical inspection.

Designed to save on fit-up and cut welding costs.

Type CCC Designed for quick easy alignment of pipe where the variation in inside diameters is relatively great. Chamfered NUBS allow close tolerance fit-up and CLEAN STRIKE OFF. ROBVON rings are beveled to assure non-restricted fluid flow.

Type CC Designed to allow quick easy alignment of pipe where the inside diameters are slightly out of round. The welder has the choice of "STRIKING OFF" the NUBS or leaving them intact to be melted into the weld mass of the first root pass.

Type C Designed for precise close tolerance fit-up. Type "C" NUBS conform to the diameter of the weld root. The NUBS melt with the metal to give complete penetration and fusion.

All Robvon Backing Rings are available in carbon steel, wrought iron, 1½T chrome ½% moly, 2¼% chrome 1% moly, 4/6% chrome ½% moly, stainless steel, and aluminum.
Write us today for more information.

ROBVON
BACKING RING COMPANY

675 GARDEN STREET **ELIZABETH, N. J.**

chosen for these exacting installations

Tower, Pools & Central Heating Plant New York International Airport. Courtesy—The Port of New York Authority

ROBVON BACKING RINGS

available through the leading welding fittings distributor.

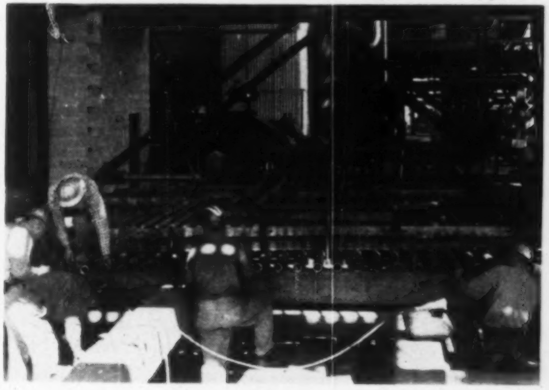
INSIST ON ROBVON PRODUCTS

Write for full details and the name of your nearest local ROBVON distributor.

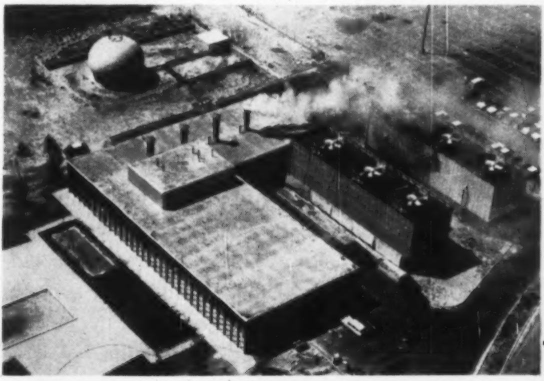
THERE IS NO SUBSTITUTE FOR QUALITY OR SERVICE . . . ROBVON INSURES BOTH.

Robvon Backing Ring Co.
675 Garden Street
Elizabeth, N. J.

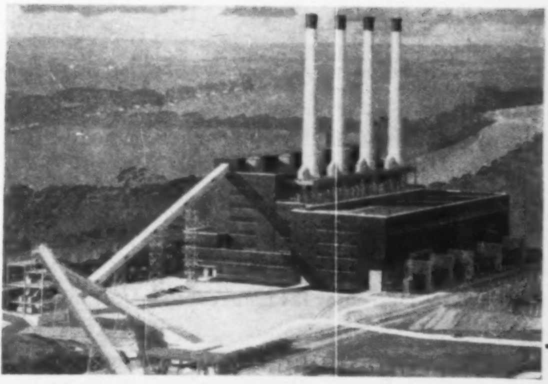
U. S. S. Nautilus. Courtesy—Electric Boat Division, General Dynamics Corp.



Courtesy—Foster Wheeler Corp.

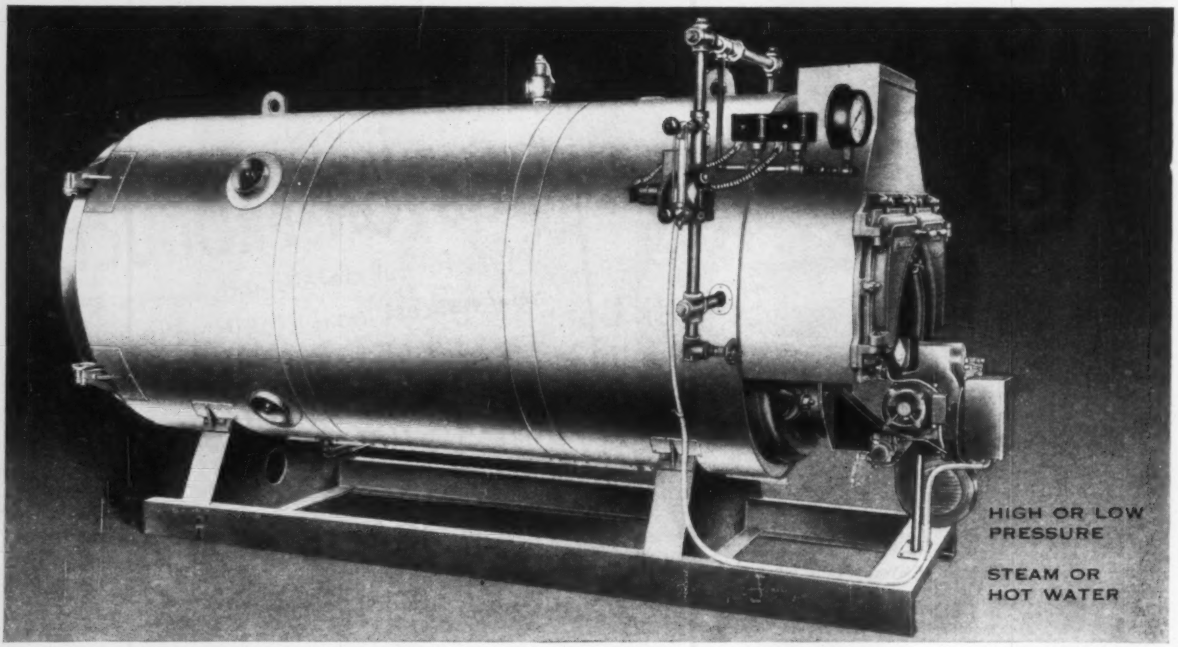


Central Heating Plant, New York International Airport. Courtesy—The Port of New York Authority



Wabash River Station, Public Service Co. of Indiana, Foster Wheeler Corp. Boilers

Announcing 8 new KEWANEE



Kewanee low pressure boiler with Iron Fireman MicroMist forced draft burner for heavy oil.

All advantages of forced draft firing now available in smaller size series

READ THESE SPECIFICATIONS. SIZE RANGE: 18 to 92 bhp. FUELS: Light or heavy oils, gas, or combination oil-gas. FACTORY ASSEMBLY: All models available factory assembled as complete package units, ready for service connections on job.

In the new Kewanee-Iron Fireman series of package units, the important advantages of forced draft firing are extended to the small "Scottie, Jr." sizes. Thoroughly proved in worldwide installations of larger size units, this new series makes forced draft firing, with all its benefits, available for smaller boiler plants.

Forced draft advantages. Forced draft firing has many inherent advantages over other methods of gas or oil combustion.

With these units there is a 50% saving in electrical power for operating motors. This is important, particularly in the larger sizes. More positive regulation is assured by controlling the air at room temperature, rather than at exit gas temperature. Equipment is smaller and requires less maintenance. In addition, a forced draft unit is much quieter than a natural or induced draft unit. No high stack needed; requires only a vent pipe.

Boilers and burners conservatively rated. There is an ample reserve capacity beyond the rated output. Normal load is carried at a comfortable "cruising speed." This assures long life with low maintenance costs. Units operate at well above 80% efficiency even at 50% above the Steel Boiler Institute rating.

Only service connections required. All boiler fittings, automatic burner controls, fuel and air systems are installed and tested at factory. Units are fire tested and shipped as a unit if desired, or boiler and burner may be shipped separately if it is necessary to protect the burner from weather or vandalism during construction.

IRON FIREMAN forced draft package units

High or low pressure, steam or hot water boilers . . . all sizes, all fuels . . . *ready to hook up and GO*

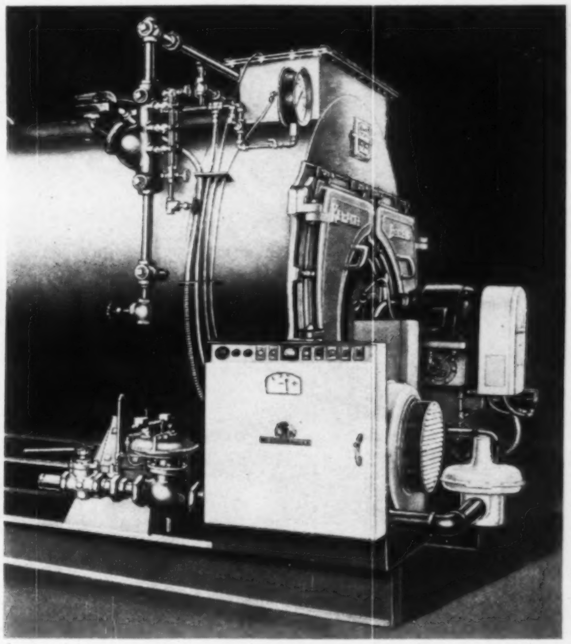
Light oil, gas or gas-oil. The Iron Fireman WhirlBlast burner is a new and advanced design. Its most outstanding feature is its ability to fire, with high efficiency, either gas or oil in a sealed combustion chamber, without flame pulsation. It is a true forced draft burner operating under firebox pressure. On dual fuel models, fuels are changed without mechanical adjustment, either through automatic controls or with the flick of a switch. From 18 to 92 bhp.

Heavy oil burner for smaller boilers. The ability to fire either heavy or light oils and to modulate over a wide range are the two outstanding features that make the MicroMist burner unique in its field. Its most notable feature is a two-stage supercharger atomizing principle which converts fuel oils, up to and including No. 5, to an air-oil mist that is readily ignited by an electric spark. No gas pilot required. For boilers from 18 to 92 bhp.

No. 6 oil or lighter—gas or gas-oil. This burner is designed for larger size boilers. Oil models incorporate the famous Iron Fireman horizontal rotary burner with Volumeter oil control, which accurately meters, by positive displacement, all grades of oil. The integrated ring type gas burner operates at highest efficiency at the same input ratings as are developed with oil. Available in sixteen sizes with capacity ranging from 59 bhp to 651 bhp.

KEWANEE BOILERS

Iron Fireman WhirlBlast burner (described above) fires either gas or light oil, or combination oil and gas, under forced draft. This is a new Iron Fireman development; never before available in the medium size range.



The Iron Fireman rotary forced draft burner (described above) fires any grade of oil, gas or gas-oil combination. It includes control panel, air and fuel systems. Control instruments are wired and tested at factory.

Write for catalog and specifications

IRON FIREMAN®

AUTOMATIC FIRING EQUIPMENT
FOR HEATING, PROCESSING, POWER

IRON FIREMAN MANUFACTURING CO.
3078 West 106th Street, Cleveland 11, Ohio
In Canada: Write 80 Ward Street, Toronto, Ontario.

Please send complete technical description and specifications.

☐ low pressure ☐ new 18 to 92 hp. units only
☐ high pressure ☐ all capacities

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Company____________________________

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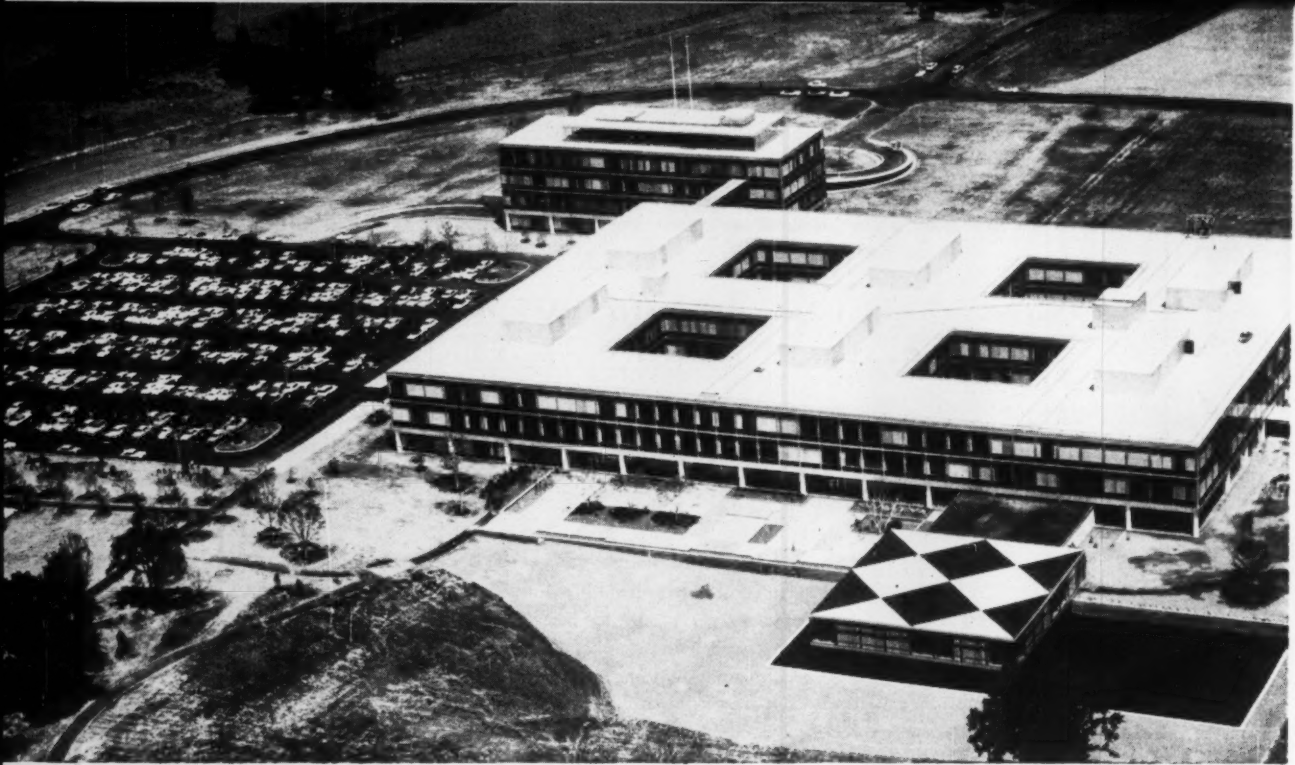
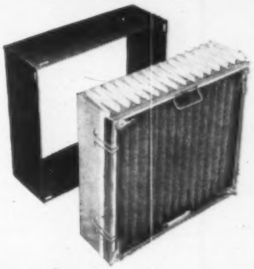


Connecticut General Life Underwrites Better Air

Architects: Skidmore, Owings & Merrill; Interior Designer: Knoll Associates, Inc.; Engineers: Weiskopf & Pickworth (structural) Syska & Hennessy, Inc. (mechanical, electrical); Consultant: BUILDING METHODS & MATERIALS: Walter C. Voss; Acoustical Consultant: Bolt, Beranek & Newman; Sculpture: Isamu Noguchi; General Contractor: Turner Construction Co.



with AAF FILTERS!

Airmat PL-24 filters selected for all-important air cleaning job

The new home office building of Connecticut General Life Insurance Company in Bloomfield is, without question, one of the outstanding architectural designs of the decade. Complete with artificial lake and a dining wing that overhangs a reflective pool, the building was designed with Connecticut General's *people* in mind. Virtually all of the Company's 2000 home-office employees are within 35 feet of a window, looking out on either a garden court or an expanse of the 275-acre tract in its natural state.

An important part of this "design for people" was clean air. The men who designed and built this striking building gave the same care and attention to the selection of air filters that was given to every other detail. From AAF's complete filter line, they selected the Airmat PL-24 to provide 650,000 cfm of better air.

The Airmat PL-24 is the world's most efficient mechanical filter for ventilating and air conditioning service. It packs 28½ square feet of filtering area into a compact 2′ x 2′ x 8″ unit . . . features low-cost renewable paper media and unit construction for simplified maintenance. For complete information on the Airmat PL-24 renewable-media air filter, call your local American Air Filter representative or write direct for AAF Bulletin No. 230.

AAF Dust Control Equipment

Illinois Heating Specialties

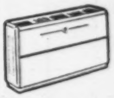
AAF herman nelson

American Air Filter
COMPANY, INC.

373 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal 9, P. Q.

— BETTER AIR IS OUR BUSINESS —

Herman Nelson Unit Heaters



Herman Nelson Unit Ventilators

America Fore
INSURANCE GROUP

THE MARK OF QUALITY

BARBER
COLMAN

Architects:
Loebl, Schlossman & Bennett, Chicago

Electrical and mechanical engineers:
William Goodman and Associates, Chicago

Air conditioning contractor:
Narowetz Heating and Ventilating Company

America Fore Insurance Group Building

230,000 sq ft

Fully air conditioned

Five fan systems plus perimeter radiation

Barber-Colman Electrionic Control Center, incorporating complete freeze-up protection

Uni-Flo ceiling and side-wall diffusers, high-velocity air valves, and return grilles

Another Barber-Colman comfort combination

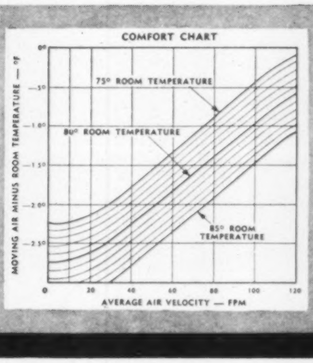
Contact your nearby Barber-Colman Field Office

See how the Barber-Colman comfort engineer offers better assistance and assures better results through *combined* automatic controls and air distribution

one source...one responsibility...

America Fore selects Barber-Colman for comfort insurance

More and more engineers and architects throughout the country are realizing the advantages of an exclusive comfort system — a combination of Electrionic automatic controls and Uni-Flo engineered air distribution products from one source, Barber-Colman. The Barber-Colman comfort engineer will consult during the design, will assume responsibility for the selection and placement of equipment and is available for supervision of installation and final balancing of the combination system. To engineers and architects, that means a comprehensive analysis of a project's automatic control and air distribution requirements and a clear definition of responsibility concerning these vitally related products, eliminating the delays resulting from conflicting obligations.



Comfort Standards

A chart, developed and used by our engineers, indicates conditions of air movement and temperature in occupancy zone. Line shown for each average room temperature is limit of satisfactory comfort conditions. Points above line fulfill Human Comfort Standards. Copies available upon request.

New fully illustrated bulletin details advantages of temperature control and air distribution system combinations available through Barber-Colman. Ask for Bulletin F 8326.

BARBER-COLMAN COMPANY

Dept. A, 1601 Rock Street, Rockford, Illinois

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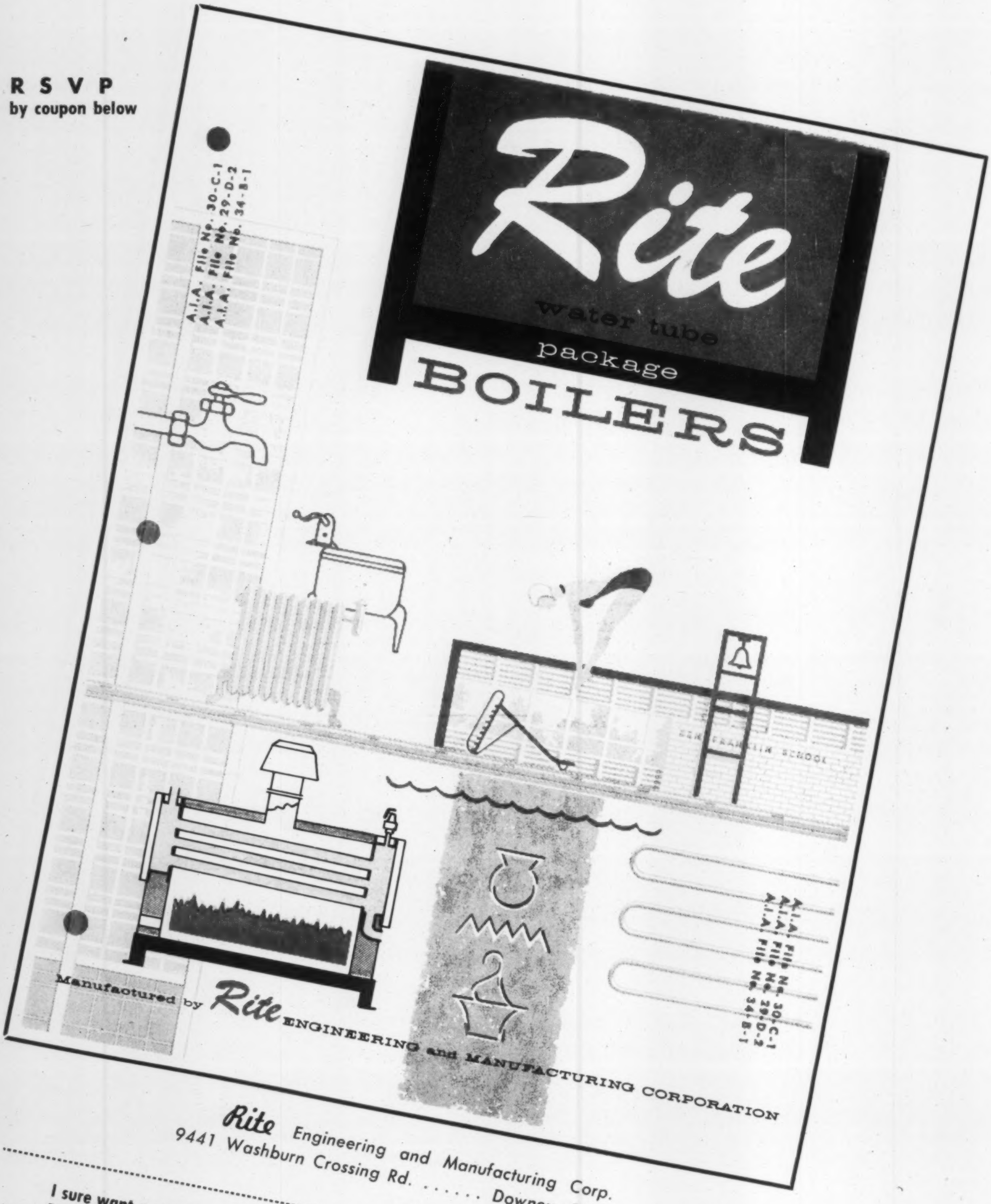
by coupon below



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A.I.A. File No. 29-D-2
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THE

OUTSTANDING

FILTER

LINE

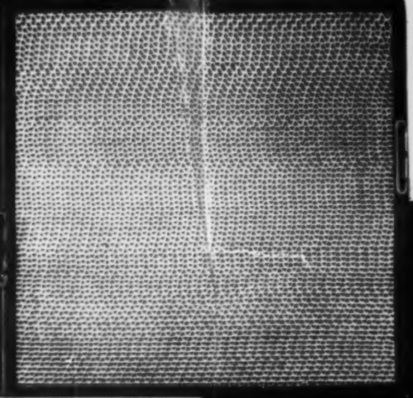
FOR

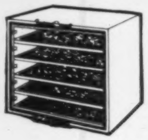
PRACTICALLY

EVERY AIR

FILTRATION

PROBLEM





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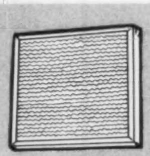
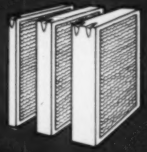
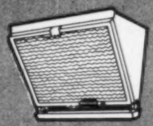
—a super-efficient, high velocity, replaceable media filter. Choice of media for specific efficiency requirements.



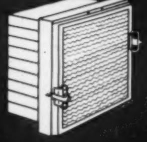
F/S FILTER
—low cost, all metal, permanent type. High or low velocity. All sizes; ⅞" and 1⅞" thicknesses.



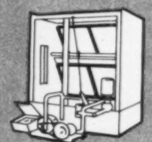
1" 2" & 4"
High-velocity, permanent, panel filters, in 1", 2" or 4" thicknesses. High efficiency, long service life, low maintenance. Available in many finishes.



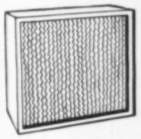
GREASE ELIMINATORS
For kitchen grease hoods. One and two-sided; available in any length and a variety of finishes.



HP PAPER FILTER
For use with standard panel filters where extra-high efficiency is required. Completely assembled, flame-proof, low cost.

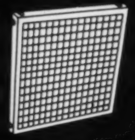


SELF-WASHING FILTER
Completely automatic washing and oiling. No maintenance. Sizes to meet any CFM requirement.

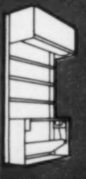


MAGNAMEDIA
—particulate filter for applications requiring ultimate efficiency.

FAR-AIR® *filters*



D/C FILTER
—economical, permanent filter with replaceable media. Standard sizes, 1" thick.



ROLL-KLEEN
Fully automatic dry type filter. High efficiency, large capacity, minimum maintenance. Sizes to meet any CFM requirement.

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Hollywood, California

Prudential Building
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United Nations Building
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Houston, Texas

Habana Hilton
Havana, Cuba

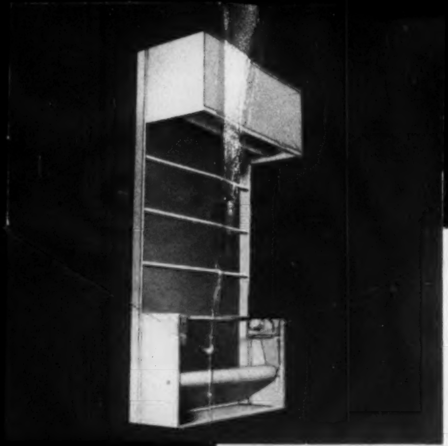
Southern California
Edison Company
Los Angeles, California

Hallmark Cards Building
Kansas City, Missouri

Marineland of the Pacific
Marineland, California

American Hereford
Association
Kansas City, Missouri

Kaiser Aluminum
Corporation
Chalmette, Louisiana



If you buy air filters on PRICE

consider this:

FAR-AIR filters will save you enough over "cheap brands" to pay for your original filter investment many times over. You get reasonable first cost . . . and lower maintenance costs for many years.

If you buy air filters on PERFORMANCE

consider this:

FAR-AIR filters handle more air with greater efficiency and less pressure loss. When you select the filter you need from the FAR-AIR line, you are assured of getting the most practical solution for your particular dust problem.

If you buy air filters on QUALITY

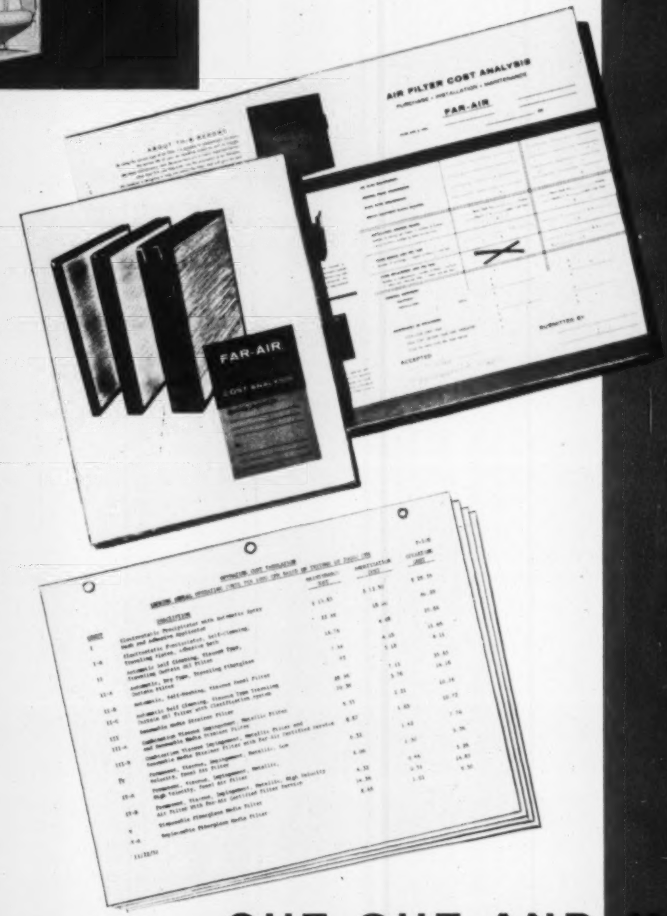
consider this:

FAR-AIR filters are built up to a standard, not down to a price. There is no compromise on quality materials, features or workmanship. FAR-AIR filters invite comparison.

If you are from "MISSOURI"

consider this:

Farr field engineers, by actual tests on your filter bank under your operating conditions, will prove to your satisfaction that FAR-AIR filters will give better performance and save you money. We make no casual claims—only request the opportunity to prove our points.



LITHO IN U.S.A.

TWO MONEY-SAVING BOOKS

Filter Cost Analysis

The cost of air filtration can be deceptive. First costs are only part of the story . . . it is the maintenance and replacement expense that determines the real cost. To help you evaluate your present filter system, Farr Company has prepared a cost analysis chart that tells you at a glance whether or not you are paying more than necessary for air cleaning. Your nearest Farr field representative will be glad to survey your filter bank and give you an evaluation of operating expenses.

Filter Selection

What type of air filter should you buy? A factual cost comparison study is available to assist you in estimating your true filter costs. This report shows the original, maintenance and depreciation costs, per 1,000 cfm per year, for all types of air filters (regardless of manufacturer).

FARR
COMPANY
NEW YORK
NEW ORLEANS
LOS ANGELES
CHICAGO
WASHINGTON, D.C.

Manufacturing Licensees:
Farr Company Mfg. Ltd.
Montreal, Canada
The Clyde Engineering Co. Pty. Ltd.
Sydney, Australia
[illegible] Ltd.
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Originators of **FAR-AIR** *Certified Filter Service*

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Send the following technical information:

- ☐ No. B-100-2A 1", 2" & 4" filters
- ☐ No. B-1300-2 HP filter
- ☐ No. B-1400-2 Roll-Kleen
- ☐ No. B-1303-1 Microloc
- ☐ No. B-201-5 Grease Eliminator
- ☐ No. B-1302-1 F/S Filter
- ☐ No. B-1000-3 Self-Washing Filter
- ☐ No. B-1301-1 D/C Filter
- ☐ No. B-1304-1 Magnamedia
- ☐ Cost Analysis Chart
- ☐ Comparative Cost Study
- ☐ Have field representative call

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TITLE____________________

COMPANY____________________

ADDRESS____________________

CITY________________ STATE________

FASTEN HERE

NO MATTER
HOW YOU
BUY

Twenty years devoted exclusively to the solution of air filtration problems is your assurance that when you install FAR-AIR you are getting the finest.

This outstanding filter line has long been known for its quality, efficiency, long service life and operating economy.

Today there is a FAR-AIR filter for every use from economy types to units which give the ultimate in high efficiency. Shown here are representative types in the FAR-AIR line. Most are available in a wide choice of materials and finishes.

FARR field engineers are located in all territories to give you immediate assistance in properly solving your particular air filtration problems.

Remember, FAR-AIR is better because it was designed that way... by FARR.

---

for any job condition... it's AGITAIR® for better air

Square, Rectangular and Continuous Diffusers

Circular Adjustable and Non-Adjustable Diffusers

Stripline Sectional and Continuous Diffusers

Choose the AGITAIR that best suits your needs — and feel secure that whichever you choose is outstanding for quality, design, service and dependability. AGITAIR is recognized as a pioneer in the development and manufacture of air diffusers... with more years of air diffuser "Know How" than any other manufacturer. Look around — you'll see AGITAIR everywhere... coast-to-coast... and throughout the world.

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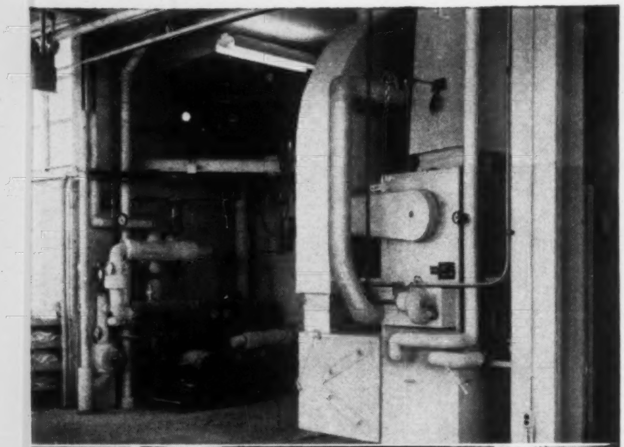
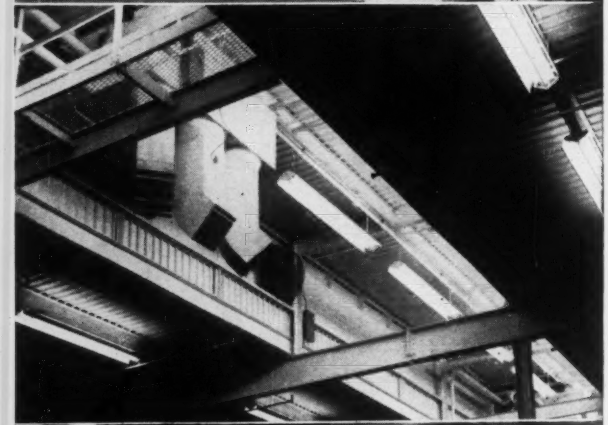
air diffusers • filters • exhausters

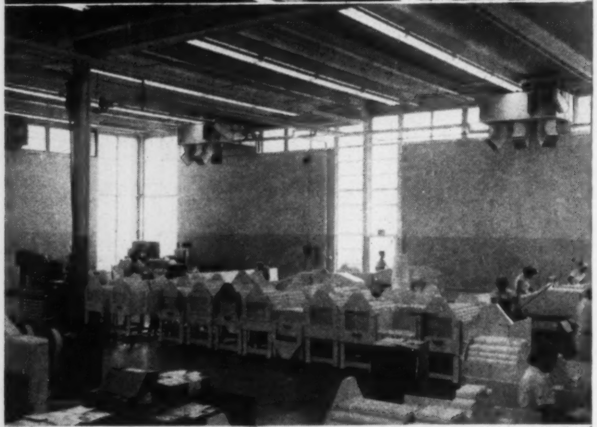
Sold exclusively by representatives for:

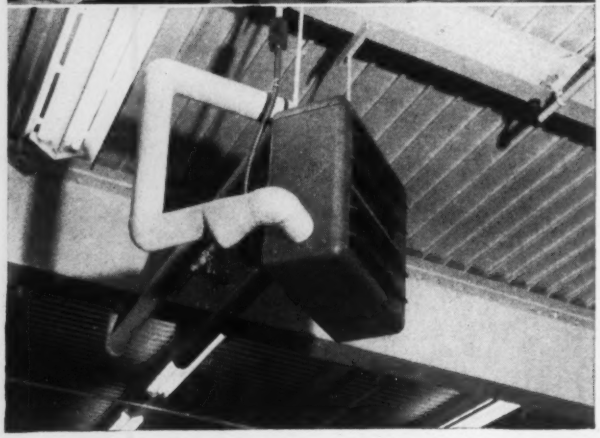
AIR DEVICES INC.

185 MADISON AVENUE, NEW YORK 16, N. Y.









At top left is one of many "Buffalo" Central Station Air Conditioning Cabinets installed in Adhesive Plaster Mill of new Johnson & Johnson plant. These versatile units can be used for cooling and dehumidifying, heating and humidifying and/or air cleaning.

Second photo shows vertically suspended down-flow "Buffalo" Lowboy Heating Units used in Shipping Center. Ideal for heating large floor areas, these quiet, highly efficient units conserve valuable storage or production space.

At extreme upper left of third photo is a quiet, compact, efficient "Buffalo" Type "NV" Propeller Fan installation in Baby Products Plant. These economical "package" units for either direct or V-belt drive are shipped completely assembled, ready for quick, easy installation. At upper center and right of photo are two more "Buffalo" suspended Lowboy Heating Units, described above.

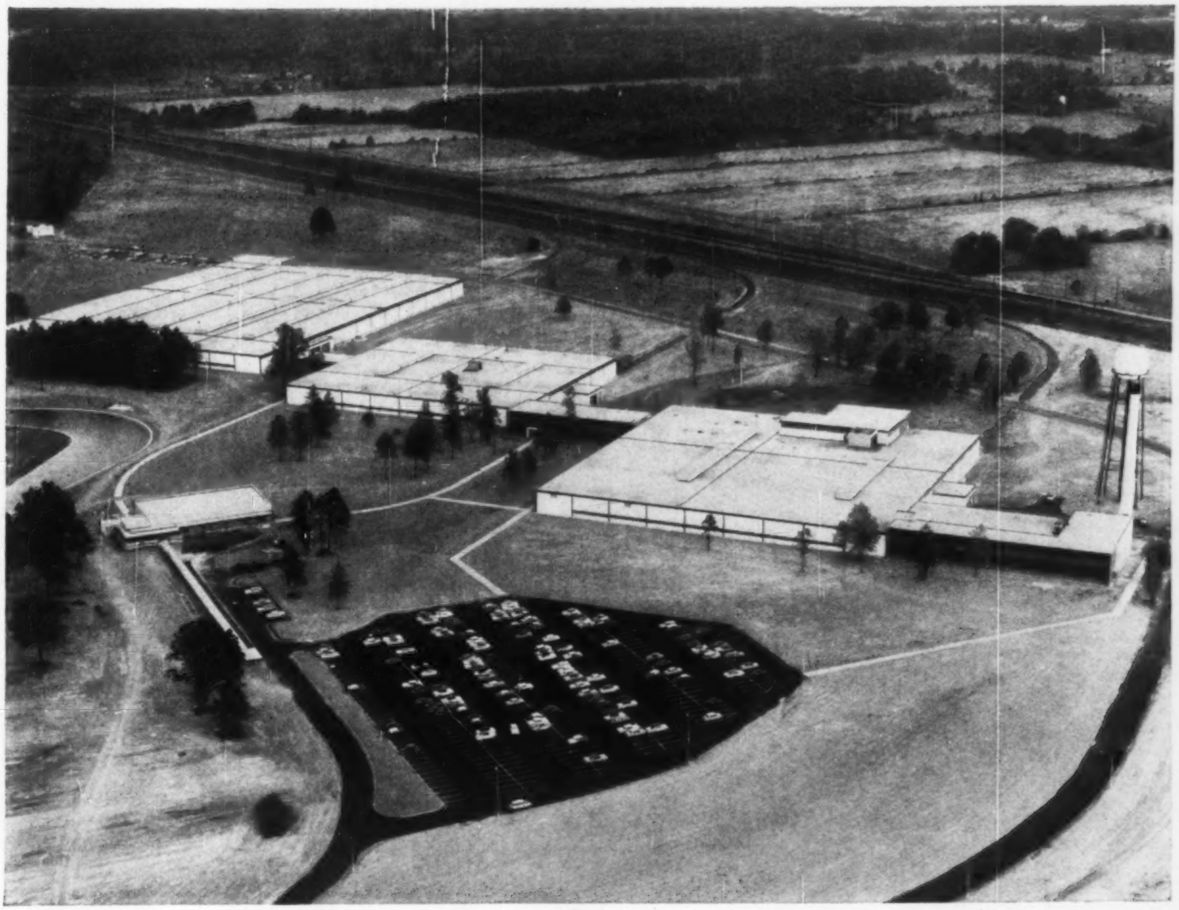
At lower left is one of the numerous "Buffalo" Breezo-Fin Unit Heaters installed in Shipping Center. The heater element is a one-piece copper tube with square copper fins, spaced to give maximum radiation. There is no possibility of inside leakage. The motor mount is welded one-piece construction.

COMPLEX PLANT HEATING

The sheer statistics of this new Johnson & Johnson plant are impressive. Located on a 300 acre tract, its 635,000 sq. ft. of floor space extend for nearly half a mile. It uses more than 1,000,000 watts of lighting, sufficient for a community of more than 900 homes. The complexity of its heating and ventilating system is indicated by the fact that it utilizes over 26 miles of piping.

"Buffalo" equipment was specified for this complex heating and air conditioning job for many important reasons:

> First, the high quality of the equipment itself . . . the "Buffalo" reputation for dependability, efficiency, advance-design, economy of operation down through the years.



Johnson & Johnson's Newest: World's Largest Surgical Dressings Plant at North Brunswick, N. J.

Engineers and Builders: Walter Kidde Constructors, Inc.,
Mechanical Contractors: Richardson Engineering Co.,
Sheet Metal Contractors: Middlesex Sheet Metal Co., Inc.

& AIR CONDITIONING PROBLEM SOLVED BY "BUFFALO" EQUIPMENT

Second, the **completeness** of the "Buffalo" line of heating and ventilating equipment . . . the wide variety of types, models and capacities to fit every possible application need. In all, "Buffalo" products quietly and efficiently handle a total of 928,000 CFM and 53,167,000 BTU/HR in this ultra-modern plant.

Third, the "Buffalo" record of more than 81 years of engineering experience, combined with modern-as-tomorrow design.

These are the sound reasons why "Buffalo" equipment was specified for the new Johnson & Johnson plant. They add up to very sound reasons for **you** to specify "Buffalo" equipment. When you plan **your** next plant heating and/or ventilating installation, be sure to call on "Buffalo". Contact your nearest "Buffalo" Engineering Representative, or write us direct for full information.

A Vital Component of Every "Buffalo" Product is the "Q" Factor—the Built-in QUALITY Which Provides Trouble-Free Satisfaction and Long Life.

BUFFALO FORGE COMPANY

171 Mortimer St. • Buffalo, N. Y.

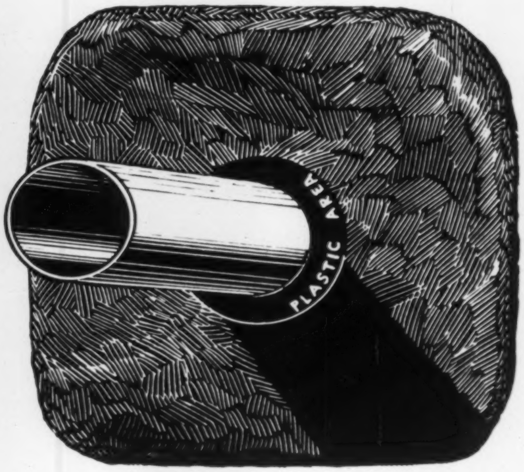
"Buffalo"

Canadian Blower & Forge Co., Ltd. • Kitchener, Ont.
Sales Representatives in All Principal Cities

INDUSTRIAL EXHAUSTERS   BELTED VENT SETS   PROPELLER FANS   "E" BLOWERS-EXHAUSTERS

NOW FROM MIRACLE THESE
INSULATION PROTECTION, AND

By far the best method of insulating underground heating systems



Miracle *insul-fil* Poured in place, it provides maximum protection plus effective insulation for underground steam and high pressure hot water distribution systems at–low cost!

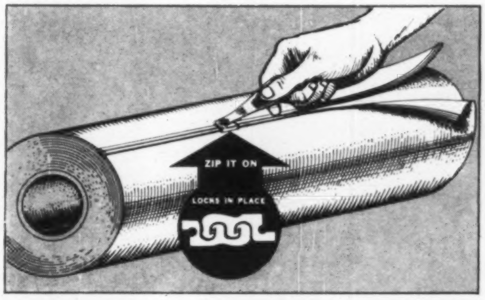
A combination of specially treated, highest commercial quality, thermal insulating material and a scientifically controlled high softening point petroleum asphalt, Insul-Fil is properly sized and blended for maximum protection and insulation of underground piping. The installation will not tend to crack or disintegrate under normal conditions. The process for the manufacture of Insul-Fil was developed by the Research and Development Department of the Atlantic Refining Company.

Introduction of steam or high pressure hot water develops heat of the proper amount to cause a plastic coating to form around the hot pipes, building up to a ½" to 1½" plastic zone depending on conditions. Around this plastic zone which has exceptionally high insulating qualities, and under certain conditions a third loose or unsintered zone of equal insulating value.

Check these Insul-Fil advantages:

- **Stable and permanent**: Takes the qualities of the volcanic rock and the petroleum asphalt from which it is made.
- **Easily handled**: Readily poured into the trench directly from the bag, by unskilled labor.
- **High insulating efficiency** . . . physical stability . . . operates effectively under wet ambient soil conditions . . . will not crack or crumble on heating or cooling . . . light in weight per unit of volume (approx. 28 lbs. per cubic foot).

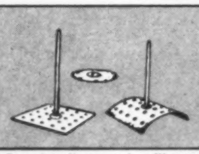
UNIQUE AND EXCLUSIVE INSULATION, INSULATION FASTENING PRODUCTS



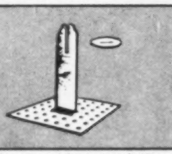
"ZIP-ON" PROTEKTINSUL OUTER JACKET FOR INSULATED PIPES AND DUCTS

"Zip-on" Protektinsul is a unique development for covering thermal pipe and duct insulation. It is a colored, prefabricated polyvinyl chloride outer jacket designed to cover and decorate as well as to protect the insulation against weather, abrasion, chemicals, mildew, etc. It is furnished to exact circumference and requires only cutting into lengths with ordinary scissors. A "Zip-on" closure is used to seal Protektinsul jacket in place, and insure watertight, airtight longitudinal joints. Tape and sealer protect and seal end joints.

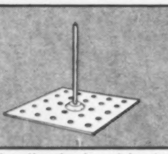
ADHESIVE APPLIED MIRACLE SURFACE ANCHORS



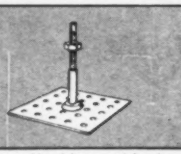
For bonding cork, fibrous glass batts, thermal cellular glass, mineral wool, etc., to ducts, walls and ceilings. Also for support of wire mesh for plaster finish. Lock washer is designed to hold insulation in place.



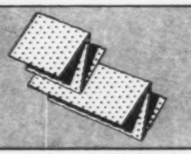
For bonding block insulation such as thermal cellular glass to ducts, walls and ceilings. Pronged Anchors are set between rows of block insulation and prongs bent in reverse direction over blocks.



For bonding furring strips to masonry walls for the attachment of wallboard. Also for installing wood floor runners on concrete floor to support 2" solid partitions (½" plaster board plus ¾" plaster both sides).



For attaching cabinets, towel, tissue and other types of dispensers to tile or other rigid surfaces. Also used for attaching plastic, wood or metal letters to glass or masonry. No drilling required.



A self furring clip for attaching wallboard, plasterboard, insulation board, etc. to exterior walls when an air space is required. Hinged construction takes up irregularities in surface to which they are bonded.

Miracle Surface Anchors provide firm, positive support for block, fibrous glass, and board types of insulation, furring strips, wood sills and headers, conduits, pipes, fixtures, etc., on all types of clean, rigid structural surfaces. These clips also provide anchorage in otherwise inaccessible locations. Miracle Surface Anchors consist of perforated metal plates 2" x 2" or 2¾" x 2¾" to the center of which is welded a spindle, prong, nail, bolt or threaded stud; selection depends upon the material and load to be supported.

The perforated base is designed to provide anchorage by bonding it to masonry, metals, plaster, tile, glass, etc., with Miracle Anchor Adhesives which are manufactured in various formulations to meet job requirements.

MIRACLE ADHESIVES FOR ANCHORS

TYPE AA — Anchor Adhesive for bonding Miracle Surface Anchors to metal or masonry walls, ducts, etc. Top thermal limits 180° F.

TYPE HT-4620 — Anchor Adhesive for bonding Miracle Surface Anchors on overhead installations and where higher heat resistance is required. Top thermal limits 225° F.

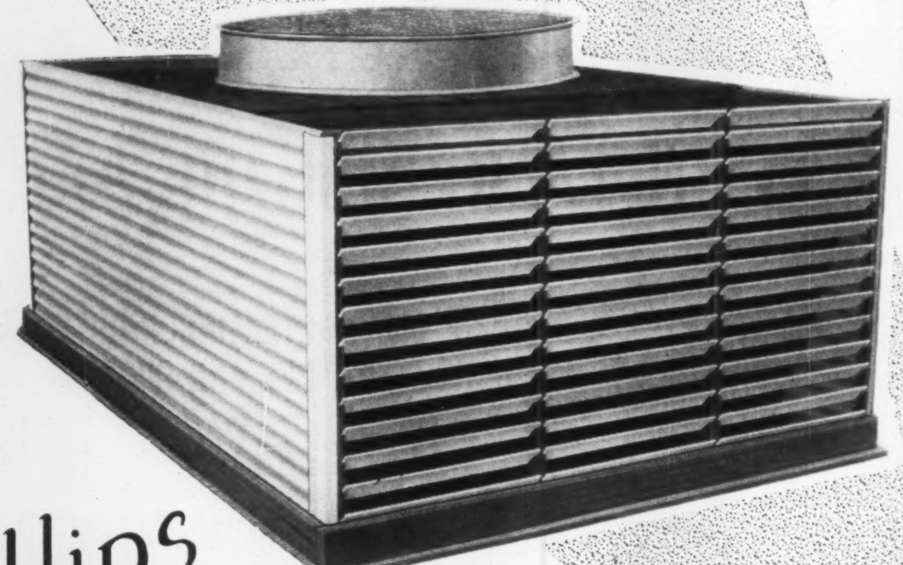
TYPE ER-475 — Two-part Anchor Adhesive for bonding Miracle Surface Anchors where highest heat resistance is required. Top thermal limits 325° F.

CONSTRUCTION BY ADHESION

MIRACLE ADHESIVES CORPORATION

250 Pettit Avenue, Bellmore, L. I., N. Y.

Technical Service: Miracle Adhesives Corporation's staff of experienced engineers and technicians will assist the architect, engineer and contractor with any insulation or Construction-By-Adhesion problem. Write for information regarding our consultation services, which are offered without cost or obligation.



Phillips

"DUAL AIRSTREAM"

The Phillips Dual-Airstream — Series "DA" Cross-Flow Towers designed for horizontal profile and minimum pumping head, have capacities from 150 to 600 tons of refrigeration.

Two years extensive testing on prototype tower plus two decades of cooling tower design experience provides a new series of towers that will meet all water cooling demands. Series "DA" towers of California Redwood or Galvanized Steel framing will give consistent rated performance with minimum maintenance.

Series "DA" towers are available in multi-cell arrangements.

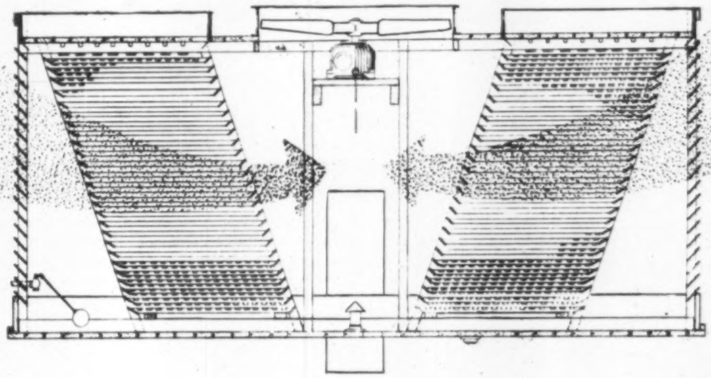
TECHNICAL DATA

TOWER NO.	OVERALL PLAN DIMENSIONS		MOTOR H.P.	WEIGHT IN POUNDS TOWER & BASIN	
	W.	L.		SHIPPING	OPERATING
DA 11W	19'-1"	10'-11"	7½	12,580	24,470
DA 12W	19'-1"	12'-11"	7½	15,400	28,640
DA 13W	19'-1"	12'-11"	10	15,470	28,710
DA 14W	21'-1"	14'-11"	10	17,200	33,340
DA 15W	21'-1"	14'-11"	15	17,430	33,570
DA 16W	21'-1"	15'-11"	20	18,370	35,610
DA 17W	19'-1"	18'-11"	20	20,110	39,530

Note: Tower height for all towers is 8'-4".
Operating weight includes 5" of water in hot water basin, and 6" of water in cold water basin.

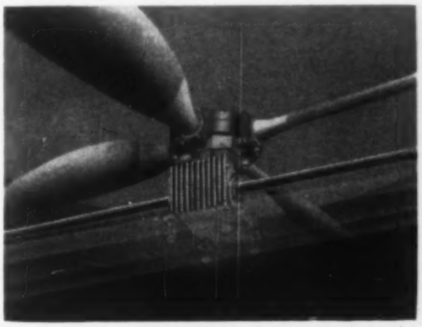
Phillips Cooling Tower Co., Inc.
220 DUPONT ST., BROOKLYN 22, N. Y.

Series "DA" towers are available in California Redwood, or Hot Dipped Galvanized framing. Corrugated cement asbestos board casing, laid horizontally, is fastened to frame with Galvanized bolts and Neoprene washers. Slip-fit louvers of flat cement asbestos board provide easy access. All hardware is Hot Dipped Galvanized.



Series "DA" towers incorporate Redwood nailless fill providing maximum wetted surface and water break-up with a minimum resistance to air stream. Minimum drift is provided by Redwood eliminators. Even distribution of water over entire fill surface is provided by properly spaced Plastic nozzles in the open hot water basin.

Access door at basin level provides accessibility to interior of tower for cleaning and servicing.



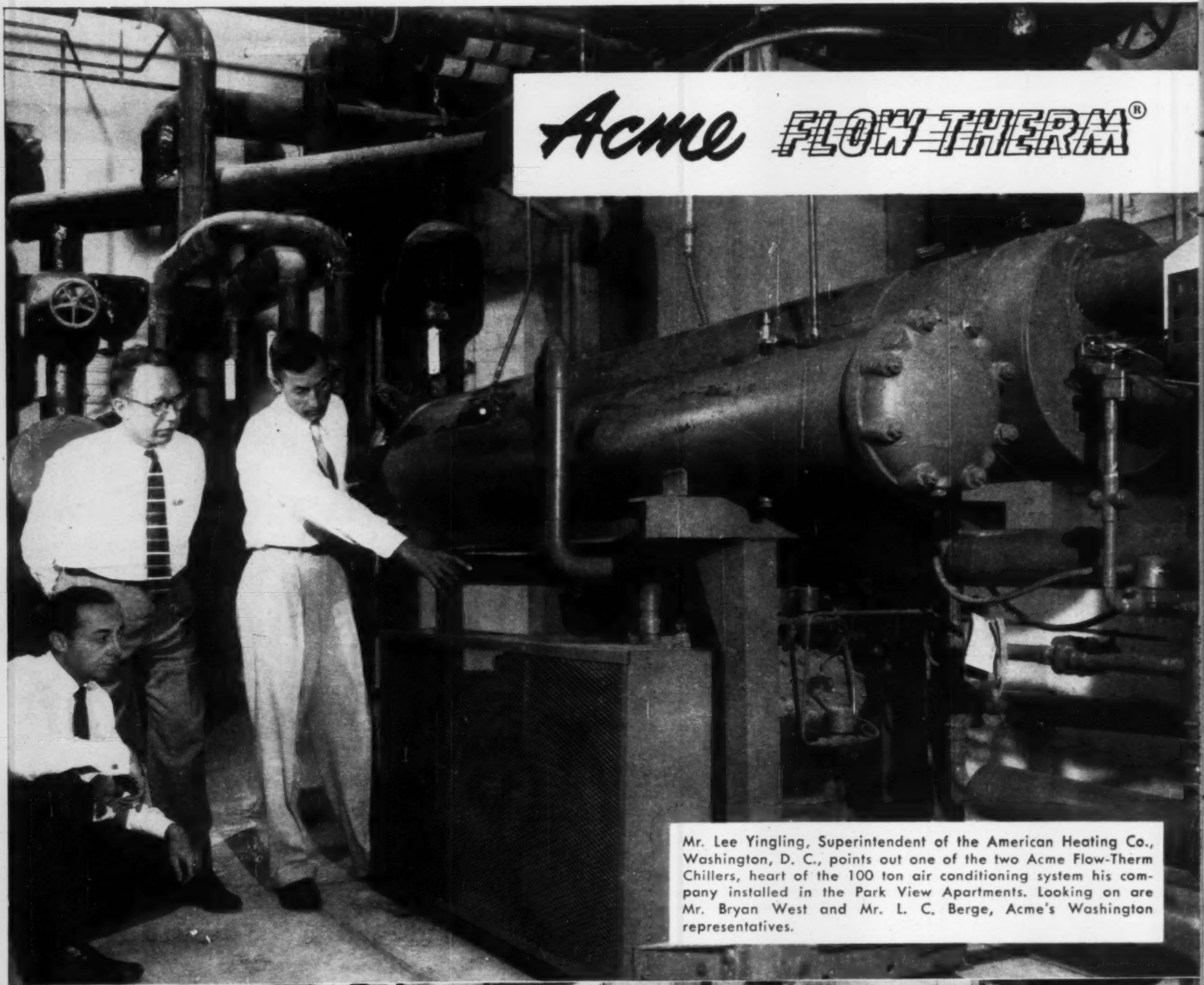
Aluminum adjustable pitch multiblade fans are driven thru speed reducers by motors mounted outside air stream. Non-lubricated type flexible floating shafts transmit power between motor and speed reducer. Integral Galvanized Steel carriers support fan, gear and motor on Redwood towers. Oil fill line and sight-glass for speed reducer extended outside fan cylinder for ease of maintenance.

V-Belt Drive systems optional. Safety Guards over fan optional.

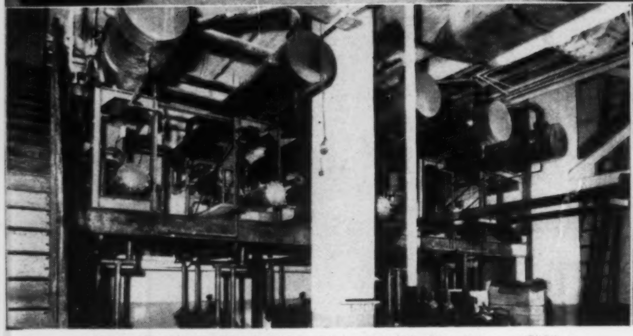
Phillips

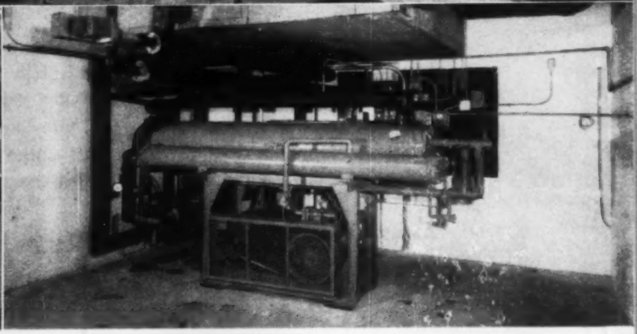
"DUAL AIRSTREAM"

Phillips Cooling Tower Co., Inc. 220 Du Pont St., Brooklyn 22, N. Y.


Acme FLOW-THERM®

Mr. Lee Yingling, Superintendent of the American Heating Co., Washington, D. C., points out one of the two Acme Flow-Therm Chillers, heart of the 100 ton air conditioning system his company installed in the Park View Apartments. Looking on are Mr. Bryan West and Mr. L. C. Berge, Acme's Washington representatives.


MULTIPLE INSTALLATION — Five 100 HP Flow-Therm Chillers provide the Merchants Bank Building, Indianapolis, Indiana, with 500 tons of air conditioning. This system was engineered and installed under the supervision of Mr. John Beaulieu, Illingsworth Construction and Engineering Co., Indianapolis.


HEAT PUMP INSTALLATION — Merchants Bank of Miami, Florida, utilizes this 30 ton Flow-Therm Heat Pump for year-round heating and air conditioning. The system was engineered and installed by F. H. McDonald, Inc., in cooperation with Norman M. Giller and Associates, Architects.

ACME
AIR CONDITIONING
REFRIGERATION

Acme INDUSTRIES INC., Jackson, Michigan

Manufacturers of Quality Air Conditioning and Refrigeration Equipment since 1919

PACKAGED CHILLERS

PACKAGED HEAT PUMPS

EVAPORATIVE CONDENSERS and COOLING TOWERS

ROOM CONDITIONERS

the truly *FLEXIBLE* Packaged Chiller

Park View Apartments look to Acme for air conditioning comfort that sells

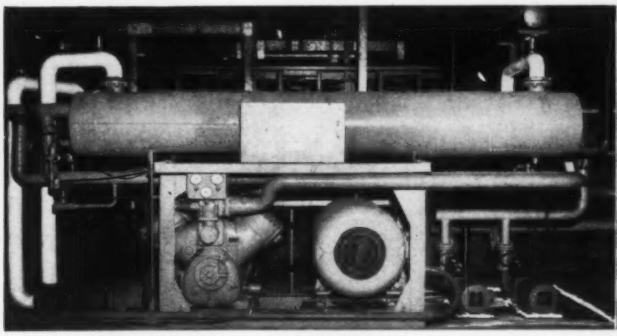
To insure the continuing popularity of their new Park View Apartments, Washington, D.C., Dan Pollin, Inc. insisted on having the most reliable air conditioning system possible. General Engineering Associates, consulting engineers for architects Berla and Abel, specified Acme . . . and with good reason. They wanted a system that would deliver full capacity for peak loads throughout Washington's long air conditioning season – they wanted a packaged chiller with proven dependability, one that was compact and economical to install. They knew an Acme Flow-Therm qualified in every respect.

With Acme you get a more complete range of models, with capacities to fit exact job requirements. This is possible because the Flow-Therm's chief components, famous Dry-Ex Chiller and Shell-and-Tube Condenser, can be tailor-made to match compressor performance exactly – combine operating economy with maximum capacity. The Flow-Therm is the most completely engineered packaged unit in its capacity range. All controls – electrical and mechanical — are supplied complete and ready for simple installation. When you buy an Acme Flow-Therm Packaged Chiller, it arrives on the job completely assembled, ready for connection to power and liquid lines.

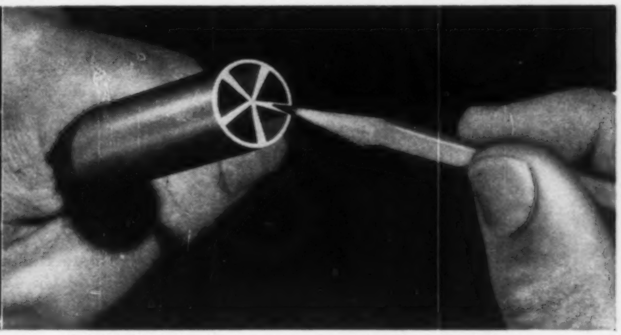
In addition to the normal factory tests for leaks and mechanical defects, all Acme packaged chillers are tested under full load conditions before leaving the factory. Every unit must perform satisfactorily at its nominal rating. Your guarantee of this tested operation is the new Acme Certificate of Performance, first in the industry. This assures the engineer and contractor, who specify and install Acme equipment, that Acme means *dependability*.

Acme Certificate of Performance issued on all Flow-Therm and Flow-Cold packaged liquid chillers, 3 through 150 tons.

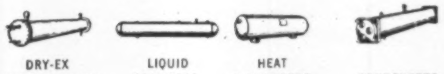
PROVEN FLEXIBILITY – Acme Flow-Therm Packaged Chillers have been proven in varied types of installations throughout the country. They have met all air conditioning, heat pump, and industrial processing requirements. Flow-Therm chillers are available in models complete with compressor, in a range from 20 through 150 tons – up to 300 tons for installations requiring remote compressors.



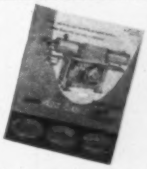
PROCESS COOLING INSTALLATION — This 100-ton Flow-Therm Packaged Chiller and a Dry-Ex fluid-to-fluid Heat Exchanger is cooling Zinc Cyanide Plating solution at Ford Motor Company's Sandusky, Ohio plant. Installation was handled by Udylite Corporation under the supervision of J. K. Rawsthorne, Sales Engineer for J. Geo. Fischer & Sons, Detroit, Mich.



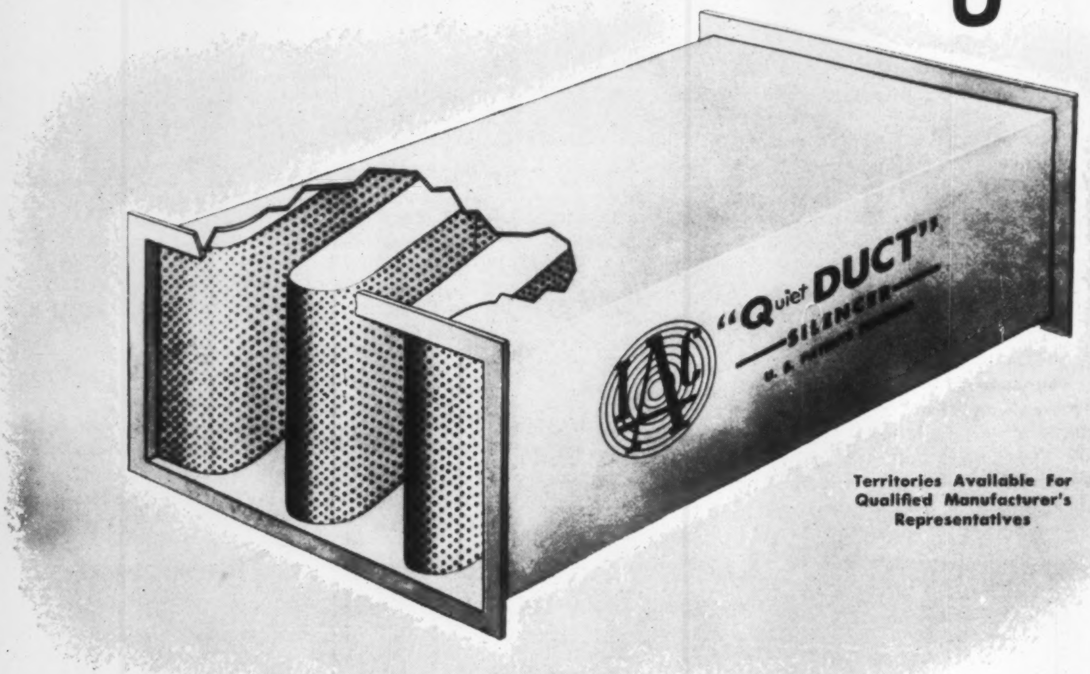
EXCLUSIVE FEATURE — Key component of the Acme Flow-Therm — the Dry-Ex chiller — contains STAR-INSERT TUBING, an exclusive design that more than doubles the heat transfer surfaces . . . gives more chilling capacity.



Clip this coupon and attach to your letterhead, to receive your new Acme Flow-Therm Catalog.



putting the SHH in air conditioning



Territories Available For Qualified Manufacturer's Representatives

GUARANTEED SILENCING AT LOWEST COST!

Easily installed "Quiet-DUCT" Silencers eliminate fan noises in the design stage — or in existing systems! Available in 148 standard sizes, "Quiet-DUCT" Silencers from 2 to 10 feet in length provide as much noise control as 30 to 200 feet of conventional lined duct.

PERFORMANCE DATA AVAILABLE!

Send coupon today.

Air Conditioning Department
Industrial Acoustics Company, Inc.
341 Jackson Ave., New York 54, N. Y.

☐ Send Catalog and full details.
☐ Please have Engineering Representative call.

NAME .... TITLE ....
COMPANY ....
ADDRESS ....
CITY .... ZONE ...... STATE ....

Air Conditioning Department

IAC
Your Standard of Silence

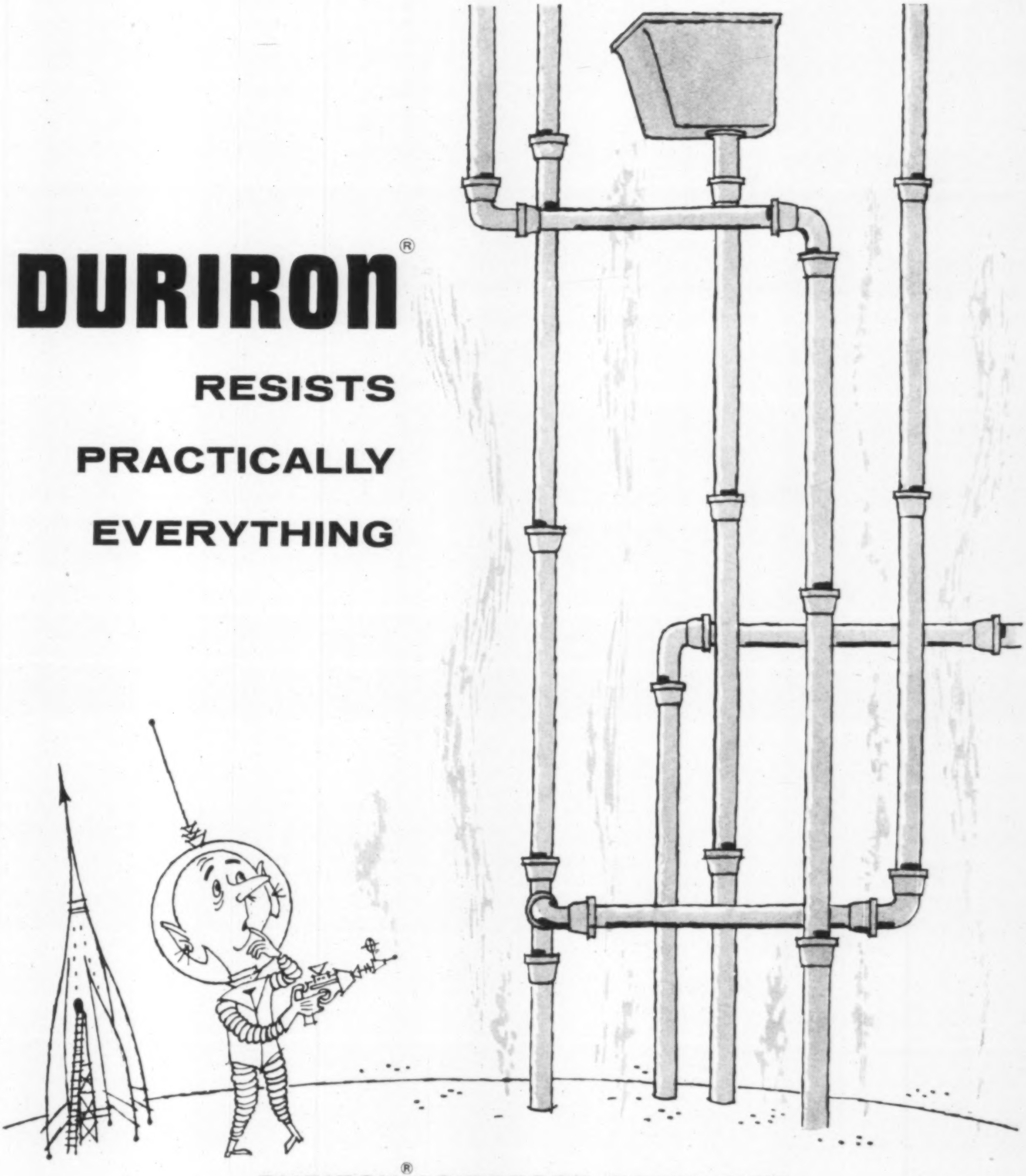
INDUSTRIAL ACOUSTICS COMPANY, INC.

"Specialists in Noise and Pulsation Control"

341 Jackson Avenue • New York 54, N. Y. • CYpress 2-0180

DURIRON®

RESISTS PRACTICALLY EVERYTHING



DURIRON® ACIDPROOF DRAIN PIPE

Duriron is *the* high silicon iron specified by architects and engineers for more than thirty years for permanent corrosive waste disposal lines. Duriron is corrosion resistant to practically all commercial acids and other corrosive solutions. Duriron is ideal for schools, hospitals, laboratories, commercial kitchens . . . wherever *permanent* waste disposal lines are required.

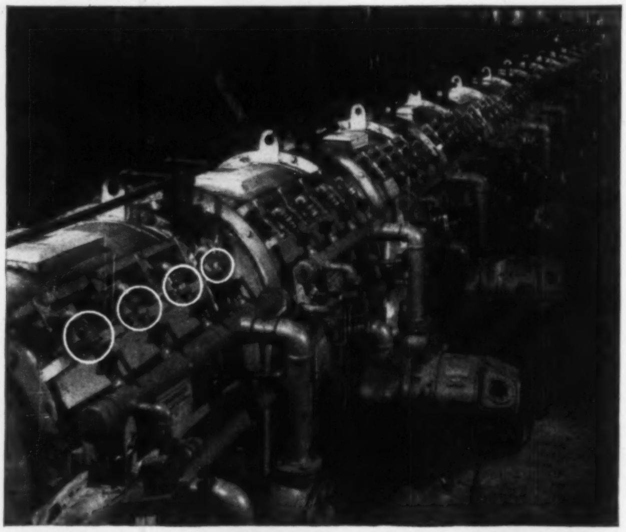
DURIRON
LOOK FOR THE NAME ON EVERY PIECE

THE DURIRON COMPANY, INC.
DAYTON, OHIO

Tough jobs are a "cinch" for DRESSER Couplings

1

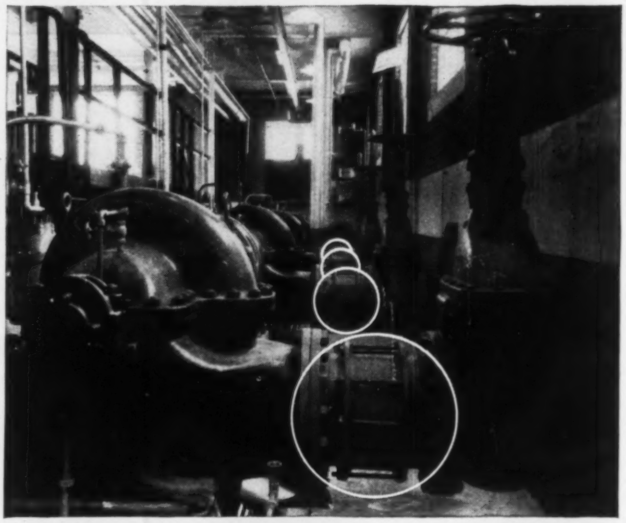
For Rapid Takedowns



When piping on this huge industrial furnace manifold is removed for periodic cleaning of burners, down time is cut to a minimum. A few turns of a wrench disengages each of the over 100 Dresser Style 65 Couplings. They are easily reinstalled.

2

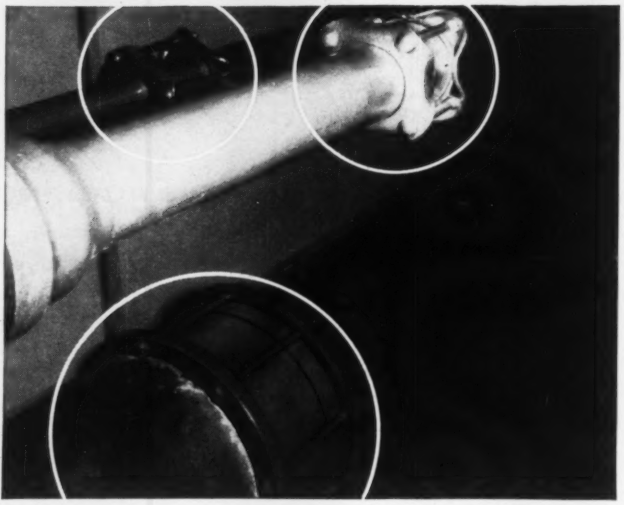
For Absorbing Vibration



No matter how much these pumps vibrate, the Dresser Style 38 Couplings stay permanently tight. They're equipped with Dresser gaskets which absorb vibration, reduce noise. Style 38's are available for plain-end steel, cast iron or other pipe. Wrench-installed in but two man-minutes per bolt.

3

For Give-and-Take Flexing



At expansion joints in walls, anchored lines carrying liquids or gases must have joints that will *absorb* pipe movements. So Dresser Style 38 Couplings are used. They have resilient rubber gaskets that absorb expansion-contraction, yet stay bottle-tight and maintenance-free.

For fast, easy, sure pipe joining, see your local piping supplier for Dresser Couplings, Ells, Tees, Adapters, etc.

DRESSER®

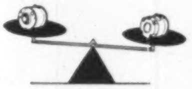
Dresser Manufacturing Division
79 Fisher Ave., Bradford, Pennsylvania
In Canada: Toronto and Calgary.

ONE OF THE DRESSER INDUSTRIES

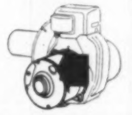
Now A New Oil Burner Motor

EMERSON ELECTRIC OF SAINT LOUIS

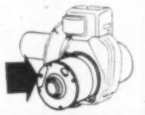
NOTE THESE OUTSTANDING NEW FEATURES



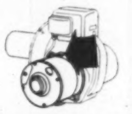
LIGHTER—less weight on supporting flange increases rigidity, reduces shipping costs. (For example, the new ⅛ h.p. motor weighs 1.4 pounds less.) The ⅛ h.p. also is shorter with no power loss. Helps you achieve more compactness in your burner units.



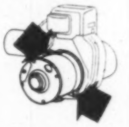
REVERSIBLE—by means of terminal block on rear endshield. Reversing leads equipped with quick connect terminals. Pressure fit metal protection cover can be instantly removed—no screws to unloose. Reversing instructions on inside of cover.



MANUAL PROTECTOR IDEALLY LOCATED—on rear endshield for maximum accessibility.



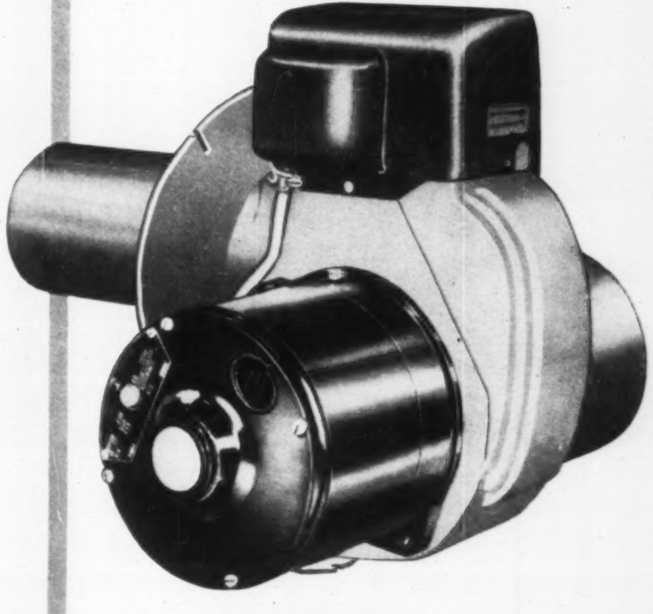
FLANGE ENDSHIELD OILER MORE CONVENIENT—prevents transformer or other burner components from interfering with reoiling.



NEW FLANGED ENDSHIELD—meets all requirements for special lead locations.

Available in ⅙ h.p. and ⅛ h.p. Meet Underwriters' Laboratories specifications for oil burner service.

The new standard motor also is available in non-reversible models.



✓ LIGHTER

✓ MORE COMPACT

✓ REVERSIBLE

This completely new Emerson-Electric Motor has earned immediate acceptance because of its simplicity and compactness of design, plus the economy stocking factor which reduces cost.

Call, wire or write Dept. M-96 today for complete information.
The Emerson Electric Mfg. Co.,
St. Louis 21, Mo.

LIVE BETTER ELECTRICALLY

EMERSON-ELECTRIC

of St. Louis

Since 1890

Macy's
Macy's
ROOSEVELT FIELD

R. H. Macy & Co., Roosevelt Field, L.I., N.Y. Architects: Skidmore, Owings, and Merrill; Consulting Engineers: Syska and Hennessy, Inc.; General Contractor: Turner Construction Co.; Mechanical Contractor: J. E. Schecter Corp.

Comfort-conditioned shopping insures profitable customer and employee relations, effective store merchandising. American Blower fans and air-conditioning units help make this possible at Macy's.

Macy's newest serves one million thrifty shoppers in air-conditioned comfort

A PROBLEM: How do you air-condition a three-level, 144-department store and maintain every inch of sales space – especially when you want to keep the roof clear for future expansion?

THE SOLUTION: Designers for Macy's new Roosevelt Field, L.I., suburban store found the answer by locating the equipment in a plenum area between roof and ceiling. Space was at a premium. Equipment had to fit within very close tolerances.

RESULT: American Blower's experience and engineering know-how enabled them to meet the challenge of this unusual installation. Air-conditioning and air-handling units were selected to give the required capacity within the size and space limitations.

Are you planning to air-condition? If so, call your nearest American Blower branch office. You'll get dependable, quality products – helpful service all the way! American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

C. V. Scott, of American Blower; A. L. Windman, of Syska and Hennessy, Inc.; and J. E. Schecter, of J. E. Schecter Corp., review blueprints used in installing Macy's air-conditioning system.

AMERICAN BLOWER

Division of **American-Standard**

QUALITY PROTECTS YOUR INVESTMENT . . . American-Standard QUALITY IS AVAILABLE AT NO EXTRA COST

QUIET-TESTED EXHAUSTERS

"Given the Works"

BY

JENN-AIR

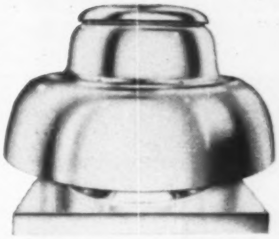
SOUND-ELEC TEST CHAMBER!

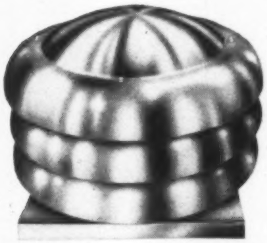
SOUND-ELEC TEST CHAMBER

Only Jenn-Air Quiet-Tested Exhausters are pre-proved under simulated field conditions. Before leaving the factory, each unit must pass rigid inspection by the critical "Vibronic Eye" . . . each is line-lab tested by Jenn-Air's Sound-Elec Test Chamber to detect noise, vibration, and structural weakness. Only units which pass this inspection are accepted for shipment.

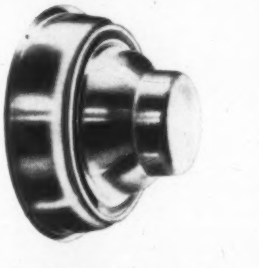
Exclusive U-Spring Suspension of Jenn-Air's *Direct Drive Power Roof Exhauster* virtually eliminates noise caused by vibration. U-Springs suspend the power assembly, isolate it from the base. Motor and blade are balanced together, as a further safeguard against vibration and noise. Heavy gauge all-aluminum housing—non-overloading all-aluminum wheel—assure trouble-free performance. Ball bearing motor is lubricated for 10 years of continuous service.

In this Quiet-Tested *Belt Drive Power Roof Exhauster*, positive weather-proof engineering is combined with trim Low-contour design. Full ball bearing drive and motor are mounted out of the air stream. Heavy gauge all-aluminum construction gives strength without weight. Exhauster can be quickly, easily disassembled for re-assembly on the roof. All standard models come with a disconnect switch as an integral part of the Unit. Non-overloading blade, dynamically and statically balanced, also ensures long life—smooth, quiet operation.

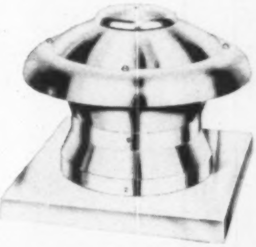




Jenn-Air *Relief Vent and Air Intake*, designed for use where positive pressure is present within the building. Constructed of heavy gauge aluminum. Relief Vent eliminates unsightly gooseneck or hood normally used for air outlet or intake. Outlet area is 100% greater than throat area, thus limiting pressure-loss through Unit to a minimum. Spring loaded or motorized back draft dampers available when specified.



Centrifugal Wall Exhauster. Eliminates most duct work. Provides a means of ventilation through the wall when roof exhausters would prove unsuitable or more costly, as in multi-story buildings. Completely weather-proof all-aluminum . . . unusually quiet . . . same non-overloading characteristics as in all other Jenn-Air Units.



Axial-Type Roof Exhauster. Recommended for general ventilation work and duct-type applications where static pressures do not exceed one-half inch. Outstanding features: Special non-overloading design . . . quiet-running pressure-type aluminum blades . . . high-quality all-aluminum construction.

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BETTER VENTILATING Equipment

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Member of Air Moving and Air Conditioning Association

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"SATISFABRICATED" AIR CONDITIONING UNITS

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WILL FIT YOUR JOB!

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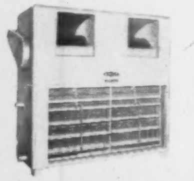
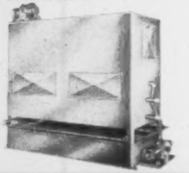
AIR CONDITIONERS

FAN & COIL UNITS

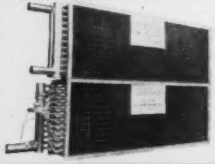


MULTI-ZONE
FAN & COIL UNITS

EVAPORATIVE
CONDENSER



COILS
HEATING & COOLING



When ordering packaged air conditioners, why should you inherit the headaches of fitting other manufacturers' unalterable "standard catalog" units to your needs?

Not when it's so easy to order "Satisfabricated" Governair units . . . completely self contained . . . completely flexible in design, to suit any particular load conditions or unusual space requirements. Governair "Satisfabricated" units operate with simple water, electrical and duct connections. Important, too, is the fact that Governair units are **engineered** better . . . and **built** better . . . to **operate** better, at minimum maintenance cost.

For more details, write the home office or refer to your classified directory for Governair's nearest representative.

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4840 NORTH SEWELL OKLAHOMA CITY, OKLAHOMA

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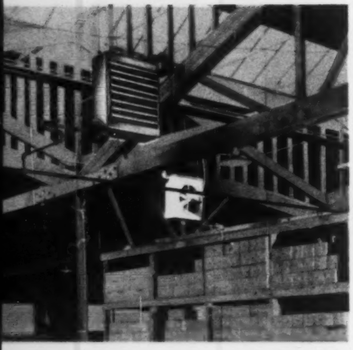
transfer

DUNHAM-BUSH

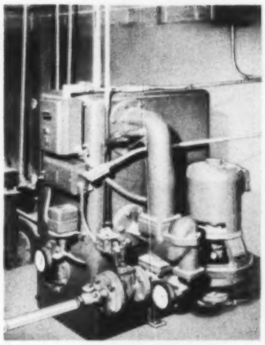
depend on **DUNHAM-BUSH** *one source.*

for AIR CONDITIONING,

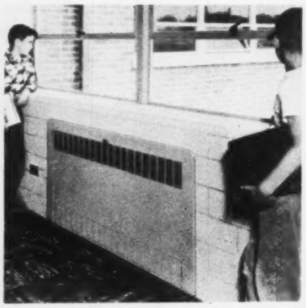


Dunham-Bush Horizontal Discharge Propeller Fan Unit Heater in warehouse. Heavy duty and cabinet blowers as well as vertical discharge propeller fan types complete the line.

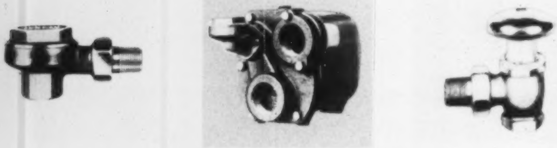
Dunham-Bush Pumps. Single and duplex vacuum models for capacities up to 65,000 EDR. Also a complete range of condensation pumps for capacities up to 50,000 EDR. Both single and duplex condensation pumps.



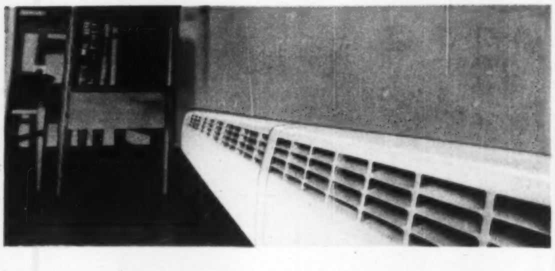
Dunham-Bush Recessed Cabinet Convector in a school. The Dunham-Bush Code Rated Cabinet Convector line for commercial, industrial and institutional buildings is complete as to size, capacity and type.



Dunham-Bush Hot Water Specialties. Circulators, circulator valves, pressure relief and pressure reducing valves, automatic air vents and float type, flow divertor fittings, flow control valves, air separator, controls.



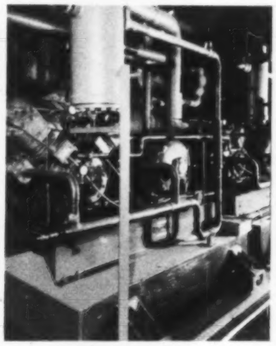
Dunham-Bush Steam Heating Line. Radiator valves, float and thermostatic traps, radiator traps, high pressure thermostatic traps, inverted bucket traps, strainer, air line valve, gauges, air eliminator and air checks, return trap.



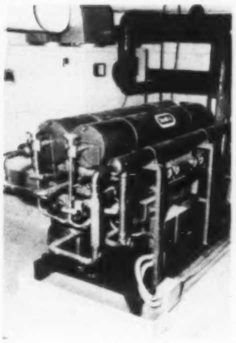
Dunham-Bush BFOT Baseboard Radiation in a college. Dunham-Bush offers three complete lines of baseboard individually engineered for residential and commercial installations.

. one responsibility

REFRIGERATION and HEATING

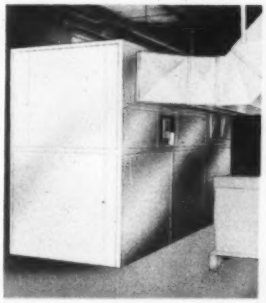


Brunner Units (40 tons each) in St. Vincents Hospital, Taylorville, Illinois. Used for air conditioning, operating and recovery rooms.

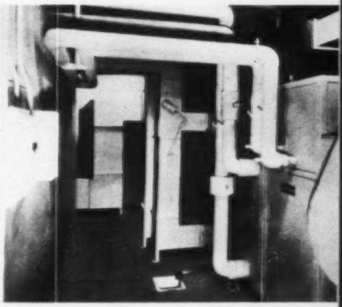


Heat-X Package Unit used to chill water for Air Conditioning in film plant. Chilled water is circulated to individual room units.

Dunham-Bush 'CPU' Pre-engineered commercial package unit in paper storage area of large printing plant.



Five Dunham-Bush Multizone Units handle 35,000 CFM of air and a total of 108 tons are installed in the Pioneer Savings and Loan Bank Building in Los Angeles. There are 30 zones in the system.



Dunham-Bush 'CR' year 'round air conditioner in office of Medical Center Building. Used for heating and cooling.

Typical Dunham-Bush Cooling Tower with new Dunham-Bush centrifugal pump used in air conditioning systems.

DUNHAM-BUSH

DUNHAM-BUSH

Members of the Dunham-Bush family have been serving the air conditioning, refrigeration and heating industries for an amazing total of 168 years.

This more than a century and a half of heat transfer experience is your assurance of *dependable* products.

And you can depend on the man behind the product . . . the Dunham-Bush sales engineer. He's ever available . . . near your town . . . to assist you. His technical skills aid you in *three* great industries.

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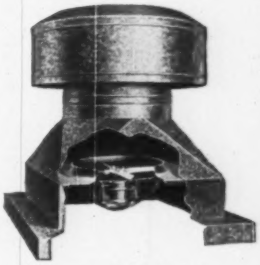
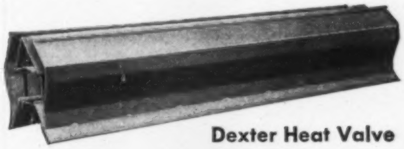
Gravity Valvent

The Swartwout Line of gravity and powered roof ventilators and ventilating louvers provides a wide range of facilities for handling vitally necessary ventilation. Experienced engineers are at your service to assist in the proper solution of your building interior atmospheric problems.

Write for Bulletin 353 — a condensed catalog describing all Swartwout Ventilators. Or refer to this item as filed in Sweet's Architectural File or Industrial Construction File.

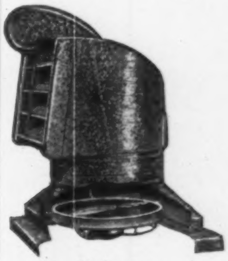


Powered Valvent

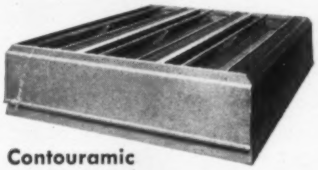


Dexter Heat Valve

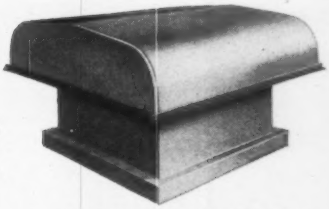
Rotary



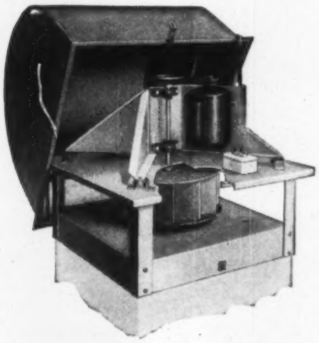
Airjector



Contouramic Airmover



Low Line — Gravity & Powered



Airlift (duct exhaust)

Ventilating Louvers

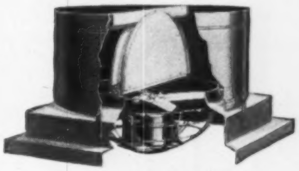
Swartwout Airlouvers are virtually custom-made at economical standard costs. Wide size variation makes it easy to fill any size wall opening with one or more uniform size sections. Fully adjustable louver blades or fixed style. Weatherproof.

Swartwout Industrial Louvers are made in standard sizes, in single, double or triple units. Building openings must be designed to receive standard dimensions.

Fire Venting

Swartwout Fire Valve (right) quickly releases smoke and heat in case of fire, helps to prevent fire spread. 46 sq. ft. opening per unit. Hinged dampers drop open when fusible link melts.

Swartwout Pyrojector (left) is designed for same purpose, is opened by powerful springs. Installs and operates entirely above roof level. 28 sq. ft. free escape area.



Whirlout

Pyrojector

Fire Valve

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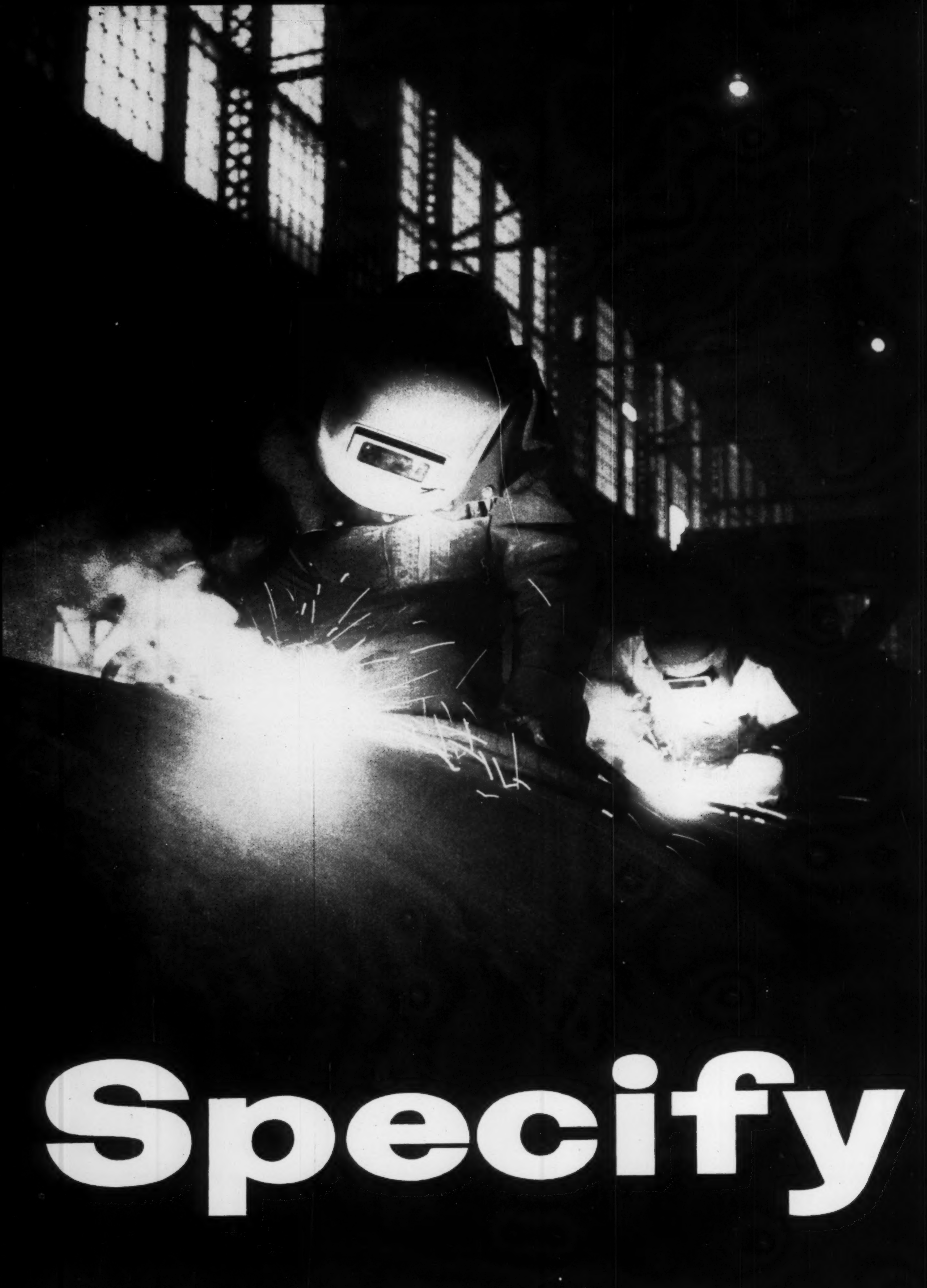
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RECO water heating equipment for ALL new buildings!

The RECO price is competitive! Delivery is fast and sure. All RECO products are guaranteed. Because RECO water heating plants handle maximum demand without straining, there will be a minimum of maintenance costs to add to your client's overhead.

Specify RECO for your next heating job. For catalogs, write: Richmond Engineering Company, Inc., 7th & Hospital Sts., Richmond, Virginia.

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- Convertors
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- Blow Off Tanks
- Boiler Blow-Down Tanks
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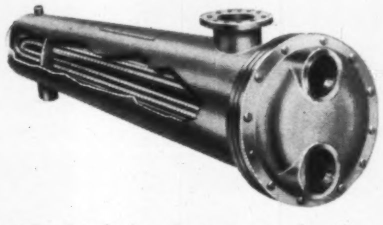
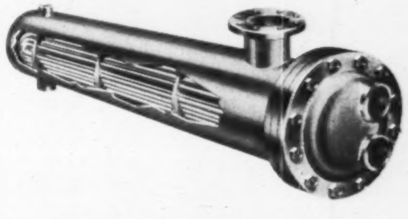
CONVERTORS



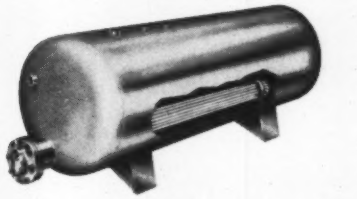
For *forced circulation* hot water heating systems specify RECO converters. Live steam in a steel shell heats water in a copper tubing network. Removable heating elements are seamless U-bend tubes to eliminate internal joints and expansion stresses.

INSTANTANEOUS HEATERS



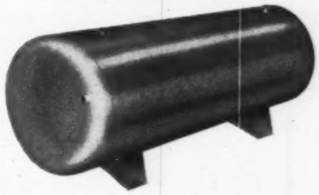
Make it a RECO instantaneous heater when your steam supply is adequate for peak loads, and a continuous supply of hot water is needed. Live steam in a steel shell heats water or other liquids in a multiple-pass network of copper tubing.

STORAGE HEATERS



Vertical and horizontal RECO storage heaters furnish large quantities of hot water for use at irregular intervals. Removable heating elements of seamless copper U-bend tubes. Fabricated from steel, copper-silicon or stainless. Linings: Baked-on phenolic resin, galvanized, cement, copper or clad materials.

STORAGE TANKS



RECO custom-builds storage tanks to *your specifications.* Bulk tanks, hydro-pneumatic tanks, above or underground tanks . . . ANY SIZE OR MATERIAL. All carry the famous RECO one-year guarantee of materials and workmanship. Underwriter's label for oil tanks or ASME stamp for pressure tanks.

◀ **FOR YOU . . . WITH OUR COMPLIMENTS.** We're so pleased with the way this photo captured "Industry at Work", we'd like to send you a full-size mat copy. Just write RECO, 7th and Hospital Streets, Richmond, Virginia.

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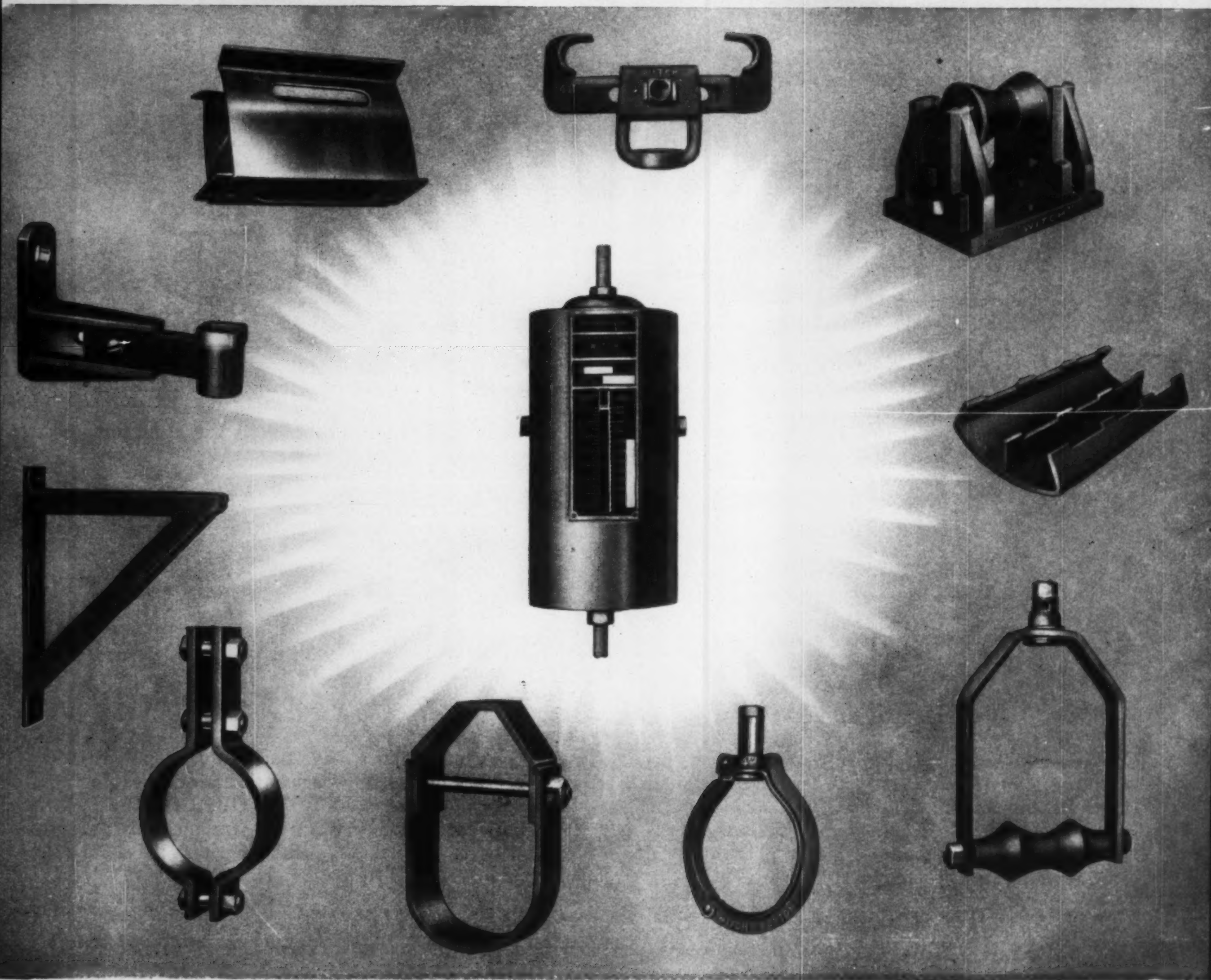

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3/8" WALL

Complete new Armaflex line includes ⅜", ½", and ¾" nominal wall thicknesses. Sizes range up to 3" IPS. For larger piping, Armaflex sheets are used.

Now—3 thicknesses of Armaflex pipe covering for temperatures from 200° down to 0°

Look for Andy Armaflex on displays or window or door decals. He identifies the wholesaler who sells Armaflex.

Now Armstrong Armaflex® comes in three wall thicknesses—⅜", ½", and ¾". With this greater thickness range, you can specify the economical amount* of insulation to stop condensation, or to save heat, on any line operating from 200° F. all the way down to zero. Armaflex is a highly efficient, flexible, foamed plastic material with a k factor of .28 at 75° F. mean temperature. Its closed cell structure is impervious to air or vapor penetration.

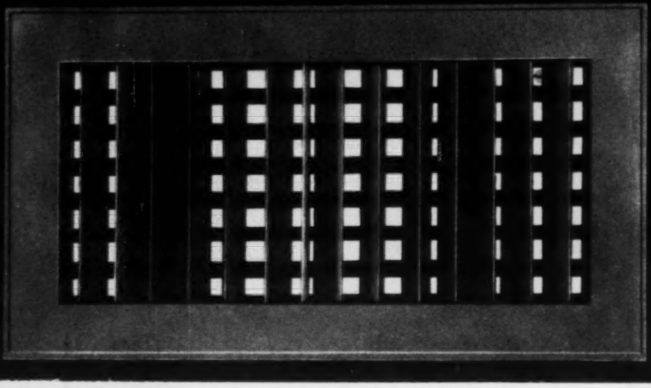
A big advantage of this flexible insulation is the speed with which it can be applied. Labor costs drop as much as 50%, compared to costs of applying more conventional insulations to pipes and fittings. Armaflex can be slipped over piping before connections are made, or slit and snapped on. Joints are sealed with 520 Adhesive. Fittings are insulated with miter-cut pieces.

* Recommended Armaflex thicknesses for various service conditions are contained in free descriptive booklet. For your copy, write today to Armstrong Cork Company, 2201 Sherman Street, Lancaster, Pennsylvania.

Armstrong INSULATIONS

PROTECT YOUR CLIENTS — SECURE for them the BEST— No. 190 MULTI-FLEX REGISTERS

The WORLD-APPROVED LINE of SILENT PERFORMANCE, GREATEST AIR-HANDLING POWER, and PERFECT AIR DISTRIBUTION For WARMING and COOLING AIR CONDITIONING



No. 190 U.S. MULTI-FLEX REGISTERS

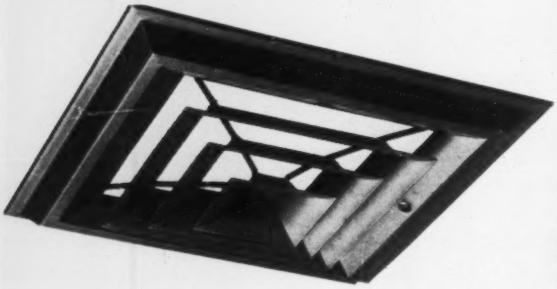
DOUBLE BANKS of Double-Edged STREAM-LINED BARS give any Direction of UP-FLOW, DOWN-FLOW or LATERAL FLOW DESIRED. Use 190 MULTI-FLEX REGISTERS ANYWHERE in COMMERCIAL or RESIDENTIAL Applications — for PERFECT AIR HANDLING and Volume Control — for Complete Satisfaction and Efficiency and ORIGINAL COST ECONOMY.

SOMETHING REALLY GREAT — A SUPERIOR DIFFUSER LINE DEVELOPED TO OFFER QUALITY AND ECONOMY

No. 1500 U.S. Round Stepped-Down CEILING DIFFUSER

No. 1501 U.S. Round Flush Type CEILING DIFFUSER

Both may be furnished with No. 1800 Round Bi-Valve Damper, SCREW-DRIVER OPERATED, with KNOB-OPERATOR ATTACHMENT available where Manual Manipulation is required. This is the FINEST DIFFUSER in its PRICE RANGE.



No. 2500 U.S. Square Stepped-Down CEILING DIFFUSER

No. 2501 U.S. Square Flush Type CEILING DIFFUSER

Both No. 2500 and No. 2501 DIFFUSERS may be furnished with No. 2800 SQUARE BI-VALVE DAMPER, with KNOB-OPERATOR ATTACHMENT available where Manual Manipulation is required. FINEST of ALL SQUARE DIFFUSERS in its PRICE FIELD.

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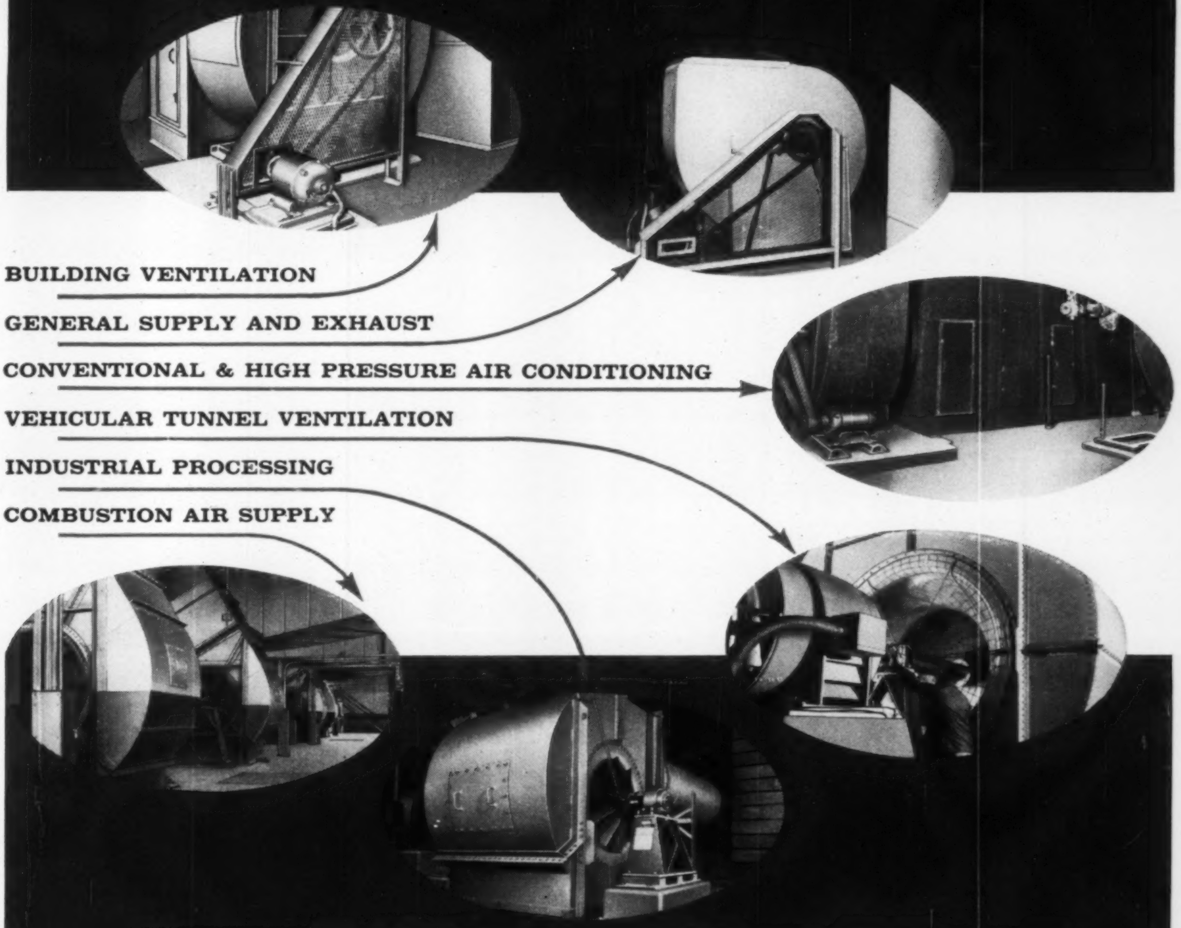

BUILDING VENTILATION
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CONVENTIONAL & HIGH PRESSURE AIR CONDITIONING
VEHICULAR TUNNEL VENTILATION
INDUSTRIAL PROCESSING
COMBUSTION AIR SUPPLY

new airfoil centrifugal fans!

... the new standard in a complete line

Westinghouse airfoil blading now gives you . . .

FULL-RANGE APPLICATION

General Purpose — Classes I and II
Up to 6¾" Total Pressure
Heavy-Duty — Classes III and IV
Up to 16¾" Total Pressure
Up to 700,000 CFM
WITH

- Lowest Operating Costs . . . High Efficiency — Low Horsepower!
- Quiet Operation . . . Airfoil Blading — Streamlined Air Flow!
- Capacity Protection . . . Steep Pressure Curve — Minimum Capacity Variation!
- Non-Overloading Power Feature! Full Load at Motor Rating — No Overload!
- AMCA (NAFM) Standard Sizes

Call your Sturtevant Division Sales Engineer or write Westinghouse Electric Corporation, Department A-2, Hyde Park, Boston 36, Mass.

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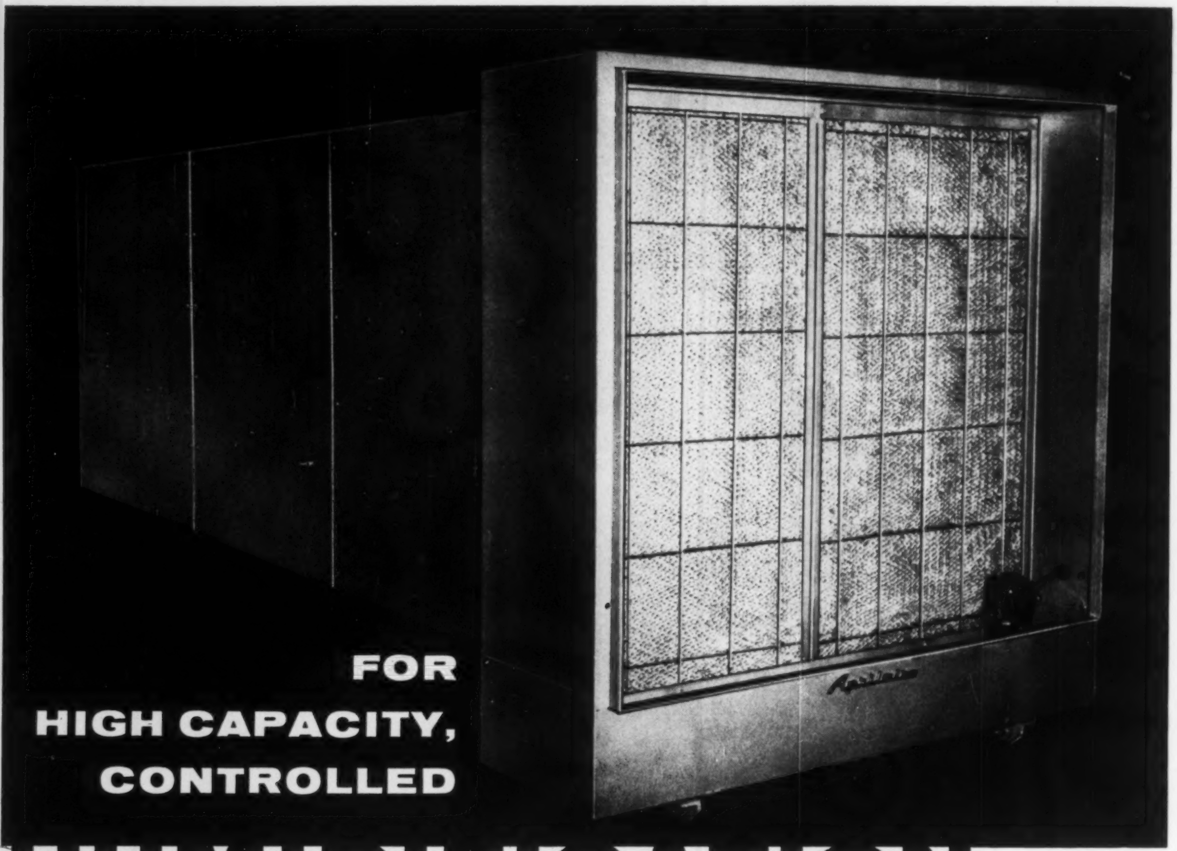
YOU CAN BE SURE... IF IT'S
Westinghouse



FOR
HIGH CAPACITY,
CONTROLLED
HUMIDIFICATION

RP Aprilaire
AUTOMATIC-ELECTRIC HUMIDIFIERS

HIGH CAPACITY

Aprilaire Industrial Humidifiers (illustrated) are designed to provide capacity for practically any size requirements. Unit sizes up to 10 G.P.H. — can be installed singly or in a series of any number of units.

POSITIVE CONTROL

The Aprilaire introduces relative humidity as needed . . . and only when needed. Automatic control eliminates possibility of lag or over-run.

FLEXIBILITY

Aprilaire industrial models are easily installed packaged units. Available for gas, steam or hot water heat source, every model can be pedestal-mounted or suspended — according to individual requirements.

BACTERIA REMOVAL

Super-clean air, carrying moisture in vapor form only, is delivered by the Aprilaire's unique principle, incorporating the use of air filters and mineral coated evaporating elements. This exclusive humidification method removes up to 70% of the bacteria in the air stream circulating through the unit.

ISOTHERMAL OPERATION

The Industrial Aprilaire has no temperature effect on the humidified air. Exhausted, humidified air is discharged at the same temperature it enters the unit.

MINIMUM MAINTENANCE

Because the only liming or water solids deposits occur on the inexpensive, replaceable evaporating elements . . . mechanical difficulties from these usually troublesome deposits are eliminated.

INDUSTRIAL AND RESIDENTIAL MODELS AVAILABLE-WRITE FOR COMPLETE INFORMATION

see our catalog in
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PLANT
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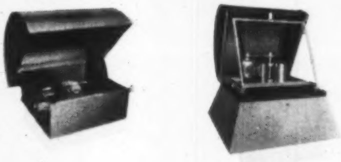
FILE
or write for copy

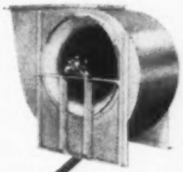
RP . . . PRODUCTS OF RESEARCH

RESEARCH PRODUCTS Corporation
Dept. 912, Madison 10, Wisconsin

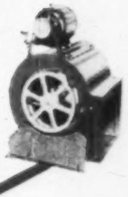
The MASSACHUSETTS *Line*®

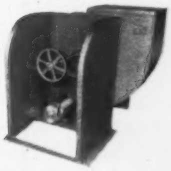
NEW ITEM
Ventilating set with
backward curve wheel
and outboard drive.
Write for Bulletin
No. 125



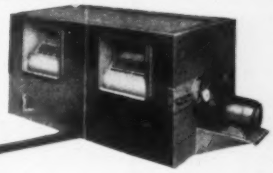


POWER ROOF VENTILATORS, Propeller Fan Type and Power Fixed (backward curve blade) offer a wide range of sizes. Bulletin No. 119 Propeller Fan Type Bull. 124 Power Fixed Fan Type.





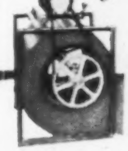
BLOWERS, Squirrel Cage (Forward Curve) and Power Fixed (Backward Curve) Fans available in a complete range of sizes, Single or double width. Bulletin 101 (PF) Bulletin 105 (S.C.).



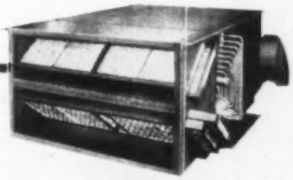
FURNACE FANS, Single, double or special width. All housing and wheel parts are die formed. Available as complete assemblies or parts only. Bulletin No. 115.

UNIT HEATERS, Blower Type floor or ceiling mounting arrangements, built in sections to facilitate efficient handling and erection. Popular sizes. Bulletin No. 112.

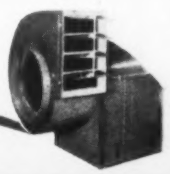
PROPELLER FANS, New Venturi-type Belt drive 24″ to 48″ wheel diameters, direct drive 12″ to 30″ diameters. A complete line of accessory items are available. Bulletin 117.

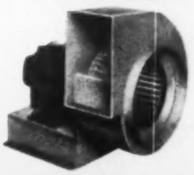


UNIVERSAL BLOWERS, A stock blower assembly made in single or double width, sizes 7″ to 27″ wheel dia. and features Universal discharge arrangement. Bulletin No. 110.



AIR CONDITIONING UNITS, Seven sizes available, ranging from 1,000 to 14,000 C.F.M. Vertical or horizontal mounting. Designed to combine cooling in summer, heating in winter. Bulletin 120.





VENTILATING SETS, Utility type. Belt drive wheel diameters 7″ to 30″. Direct drive 6″ to 13½″. Both available in popular competitive sizes, self contained completely packaged units. Bulletin 109.

MASSACHUSETTS BLOWER DIVISION

The BISHOP & BABCOCK *Mfg. Co.*

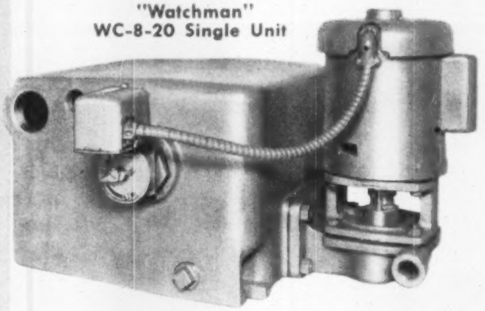
4901 HAMILTON AVENUE · CLEVELAND 14, OHIO

HOFFMAN "WATCHMEN"

CENTRIFUGAL TYPE CONDENSATION PUMPS

First...

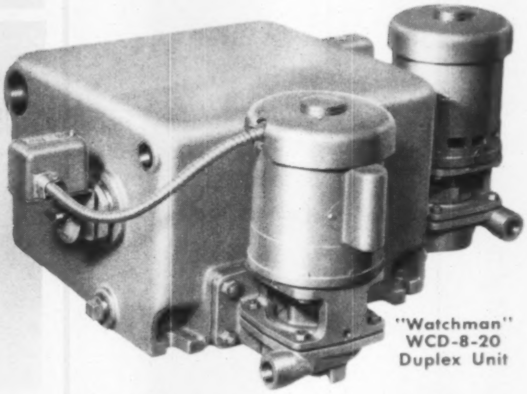
we introduced the "Watchman" WC-8-20 Single Unit Condensation Pump for systems up to 8,000 sq. ft. E.D.R. and 20 lbs. discharge pressure. Receiver capacity: 9 gallons.



"Watchman"
WC-8-20 Single Unit

Next...

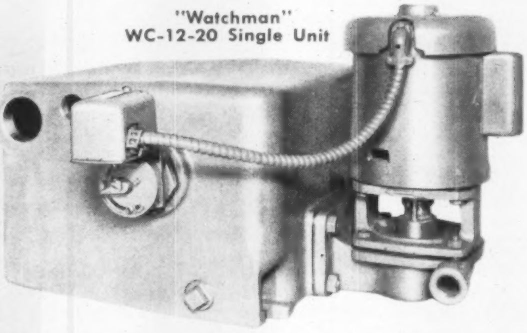
we offered the "Watchman" WCD-8-20 Duplex Unit Condensation Pump (two motors, two pumps, two float switches) for systems up to 8,000 sq. ft. E.D.R. and 20 lbs. discharge pressure. Receiver capacity: 14 gallons.



"Watchman"
WCD-8-20
Duplex Unit

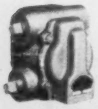
and NOW!

we offer the "Watchman" WC-12-20 Single Unit for systems up to 12,000 sq. ft. E.D.R. and 20 lbs. discharge pressure. Pump capacity is 18 gallons per minute. Receiver capacity: 14 gallons.



"Watchman"
WC-12-20 Single Unit

Your Hoffman wholesaler stocks "Watchman" pumps and he also stocks the Hoffman complete line of heating specialties. Call him for latest literature with specifications.



F & T Traps

Bucket Traps

"Y" Strainers

Featuring:

- ★ Durable Cast Iron Receivers
- ★ Precisioned one piece bronze impeller
- ★ Efficient bronze fitted centrifugal pump with stainless steel shaft
- ★ Heavy duty double pole float switch
- ★ Quiet, 1/3 H.P., 3450 R.P.M. Motors
- ★ Packed type stuffing box

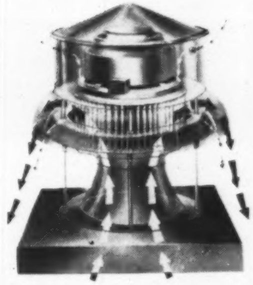
HOFFMAN SPECIALTY MFG. CORP.
1700 W. 10TH STREET, INDIANAPOLIS 7, INDIANA

Be Sure You Get All 12

When You Specify Power Roof Exhausters

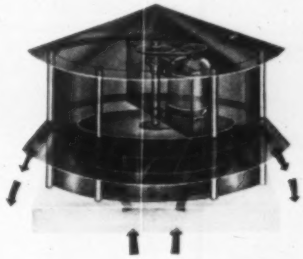
Direct Connected® Air-Vans

150 to 11000 CFM
Develops up to 4" S.P.



Belt-Drive® Air-Vans

1000 to 65000 CFM
Develops up to 4" S.P.



	Gallaher Air-Vans®	Unit A	Unit B	Unit C	Unit D	Unit E	Unit F	Unit G
INCONSPICUOUS APPEARANCE	✓							
LOW INSTALLED SILHOUETTE	✓							
A CORROSION RESISTANT FINISH	✓							
SOUND STRUCTURAL DESIGN	✓							
SHIPPED COMPLETELY ASSEMBLED	✓							
QUIET OPERATING	✓							
CERTIFIED RATINGS	✓							
SCROLL DESIGN	✓							
WEATHERPROOF	✓							
PATENTED AIR SEAL-OFF	✓							
A MEANINGFUL GUARANTEE	✓							
STANDARD MOTORS	✓							

These are the 12 vital features that wise engineers and architects check when specifying power roof exhausters, and every one of them is present when you buy Gallaher Air Vans. They are the secret to extra years of service and highly efficient performance. Each feature is necessary from all points of view. The owner will save money over the years. The architect and engineer will achieve function and appearance.

For full and complete information about Gallaher Air Vans, see your Gallaher representative or write to:

The GALLAHER Company
4108 Dodge Street Omaha, Nebraska

Export Office: 306 Paul Bldg., Utica, New York

guaranteed*
insulating performance

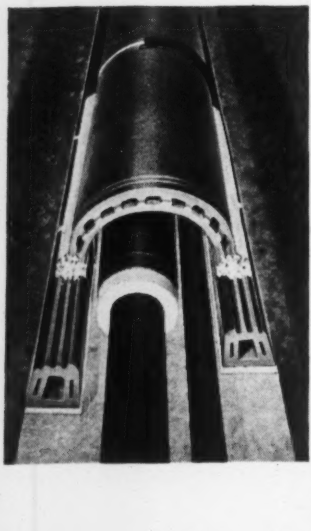
*proved in actual installation**

95.7% thermal efficiency

*proved by controlled laboratory test**

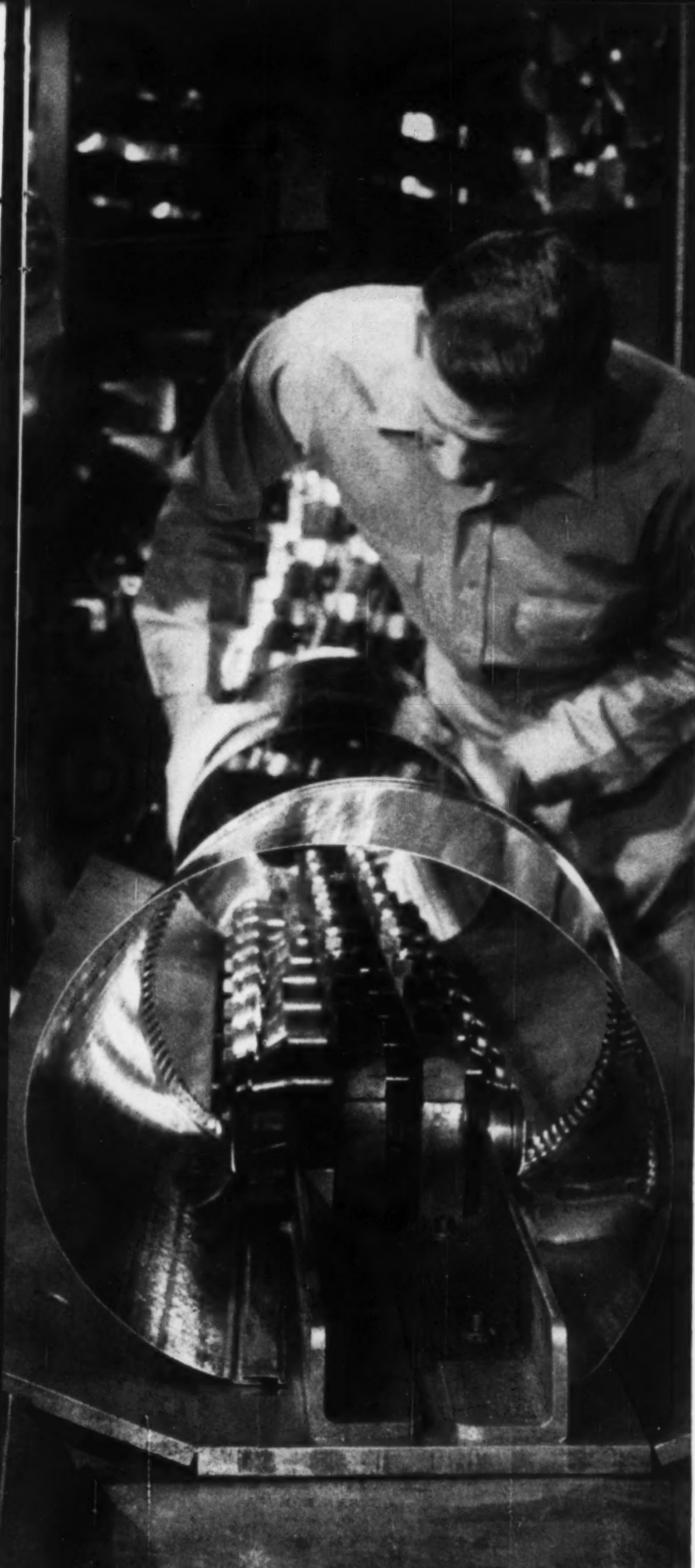
stronger
than standard or extra strength clay pipe

*Write Dept. T-1, 825 Frelinghuysen Ave.,
Newark 12, N. J., for complete performance data.



Therm-O-Tile®
conduit system
FOR UNDERGROUND PIPING

H. W. PORTER & CO., INC. • REID HAYDEN, INC.
825 Frelinghuysen Ave., Newark 12, N. J. Baltimore, Richmond, Charlotte



"We just don't worry about chipping or flaking when we lock-seam WEIRKOTE®!"

If those difficult lock-seaming operations give you trouble, it's time to take the step that fabricator after fabricator is taking.

Switch to Weirkote zinc-coated steel as promptly as you can.

Weirkote's skin-tight continuous-process zinc coating takes the most complicated short-radii bends without chipping or flaking. Takes *anything* that steel alone can take—spinning, deep drawing, crimping, beading, twisting, the works. Comes through in perfect shape to give your products lasting anti-rust protection, such as they've never had before.

Weirkote's made that way to behave that way.

Can you think of a quicker, easier step to an even better product? To fewer rejects? To more peace of mind? To lower costs? And, perhaps most important, to the greater good will of customers who receive even more value for their money?

Write today for the free booklet that will give you lots of food for thought on the many advantages Weirkote can bring to your products and production. Weirton Steel Company, Dept. M-1, Weirton, West Virginia.

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a division of

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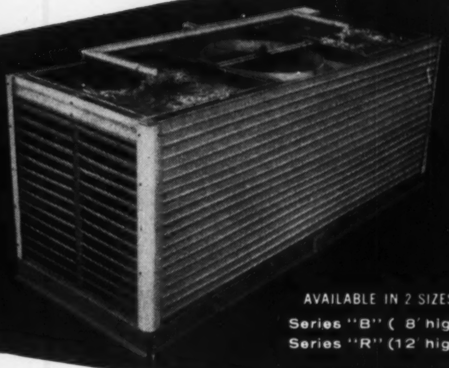
THESE

PRITCHARD

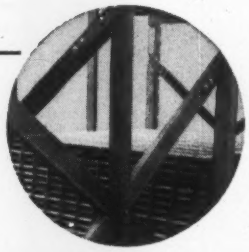
LOLINE®

FEATURES



AVAILABLE IN 2 SIZES
Series "B" (8' high)
Series "R" (12' high)

Give You More for Your Cooling Tower Dollar!

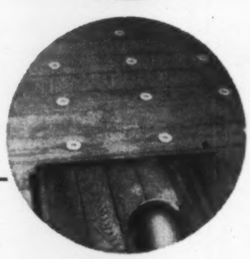


ALL HEART REDWOOD FRAMEWORK

Here is framework designed to withstand windloads of 100 mph (30 lbs./sq. ft.). The same heavy cast iron connectors used in the largest Pritchard industrial towers are used throughout. This rugged framework is built to last and last.

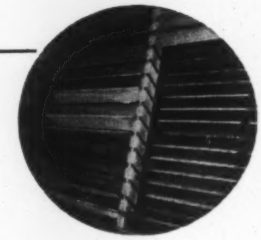
FUNCTIONAL, ATTRACTIVE EXTERIOR

The corrugated asbestos cement board casing used on the LoLine has horizontal corrugations which further enhance the low silhouette of both the Series "B" (8' high) and the Series "R" (12' high) tower. Casing is securely bolted to the framework and corners are covered with asbestos cement corner rolls.



TROUBLE-FREE DISTRIBUTION SYSTEM

This open distribution system results in low pumping head requirements. Removable ceramic orifices distribute water uniformly over the Redwood filling.



SIMPLE, RUGGED FILLING AND DRIFT ELIMINATORS

Only Clear All Heart Grade Redwood is used in the nailless filling of the LoLine. This filling offers efficient breakup of water with minimum resistance to air flow. The drift eliminators effectively remove water from the discharge air.

WANT ALL THE FACTS . . .
Plus Complete Engineering Data?

The new, LOLINE Bulletin (No. 5.1.902) is a unique brochure—now you can have all the information you want from one convenient source. Mechanical and structural features are explained, complete engineering drawings and capacity tables are included. You can get your free copy by writing today on your company letterhead — no obligation, of course.

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COOLING TOWERS
GAS & AIR TREATING EQUIPMENT

REPRESENTATIVES
IN PRINCIPAL CITIES
FROM COAST
TO COAST

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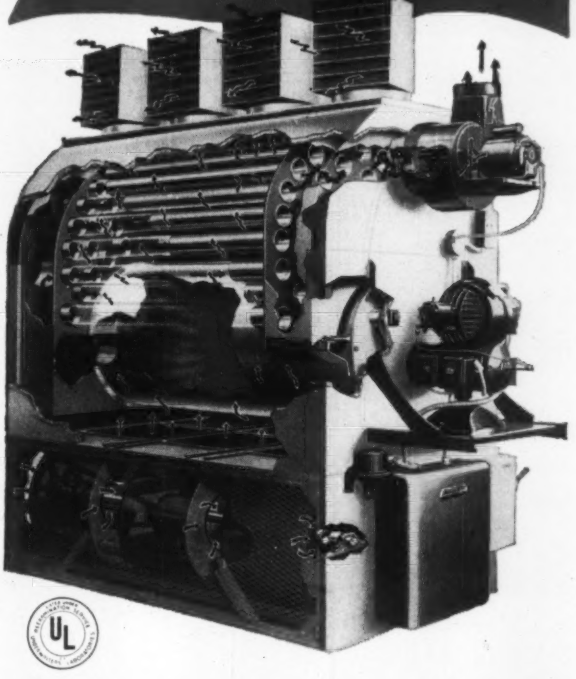
OF CALIFORNIA
A DIVISION OF J. F. PRITCHARD & CO.
Dept. 589, 4625 Roanoke Parkway, Kansas City 12, Mo.

Commercial-Aire

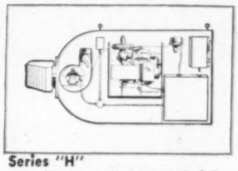
DIRECT-FIRED

Space Heaters

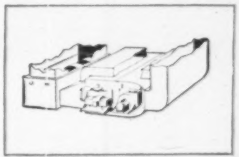
300,000 BTU's TO 2,000,000 BTU's



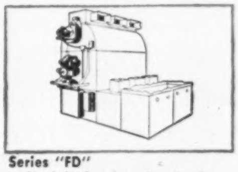
Provides industry with lowest cost heating. Primary cylindrical stainless steel combustion chamber, secondary heat-extracting tubes, consistent rate of combustion gas flow provide high efficiency, utilizing 80% of available heat of fuel. Highly adaptable to desired mounting arrangements. Features low first cost, easy maintenance, complete accessibility to all service points. Completely equipped and wired with controls for economical installation. Write for Bulletin C-357.



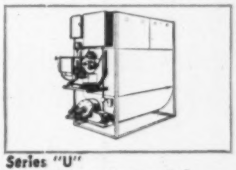
Series "H"
Horizontally suspended.



Series "HD"
Horizontally for duct distribution.



Series "FD"
Upright for duct distribution.

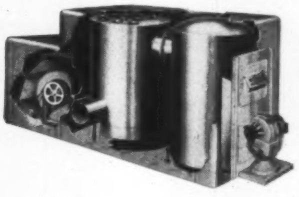


Series "U"
Inverted suspended.

MAMMOTH

ADAPTO FURNACES

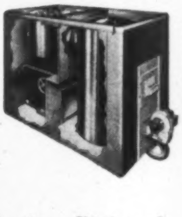
7 Designs From 8 Sizes/315,000 to 2,379,000 B.T.U.'s



Efficient, economical and adaptable. Vertical tubular design, welded heavy duty boiler plate steel construction. Economical with all fuel. Balanced heat transmission. A size and casing arrangement to fit every location. Features long flue travel, heat saver, extra head space. Radiant straight line heat increases efficiency. Baked enamel casings. Oil, gas or coal fired. Write for Bulletin 57M-1.

COMPACTO FURNACES

5 Sizes/175,000 to 413,000 B.T.U.'s



Compact, efficient and economical. Vertical tubular design. Welded heavy duty boiler plate steel construction. Compact casing encloses primary chamber, heat saver, blower, motor and filters. Efficient and economical with *oil, gas,* or *coal.* Write for Bulletin 57M-1.

MAMMOTH

COMPACTO HORIZONTAL SUSPENDED HEATERS

7 Sizes/185,000 to 450,000 B.T.U.'s

Require no floor space. Easily suspended from rafters or installed in loft or attic with or without ducts. Available as complete wired package ready for fuel line hook-up or with burner and controls unwired and unassembled. Has rugged 10 and 11 gauge welded plate steel heat exchanger with internal stainless steel combustion chamber for trouble-free performance. Oil or gas fired. Write for Bulletin 57S-1.

MAMMOTH FURNACE COMPANY
6425 Cambridge Street • Minneapolis 26, Minnesota

MAMMOTH FURNACE COMPANY
6425 Cambridge Street/Minneapolis 26, Minnesota

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☐ Bulletin C-357 ☐ Bulletin 57M-1 ☐ Bulletin 57S-1

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CITY____________ZONE______STATE________

IF IT'S A "MOTORPUMP" IT HAS A BUILT-IN

Reputation

One sure way to minimize costly call-backs on air conditioning pump installations is to start out with a unit you *know* will stand up on the job without need for excessive maintenance.

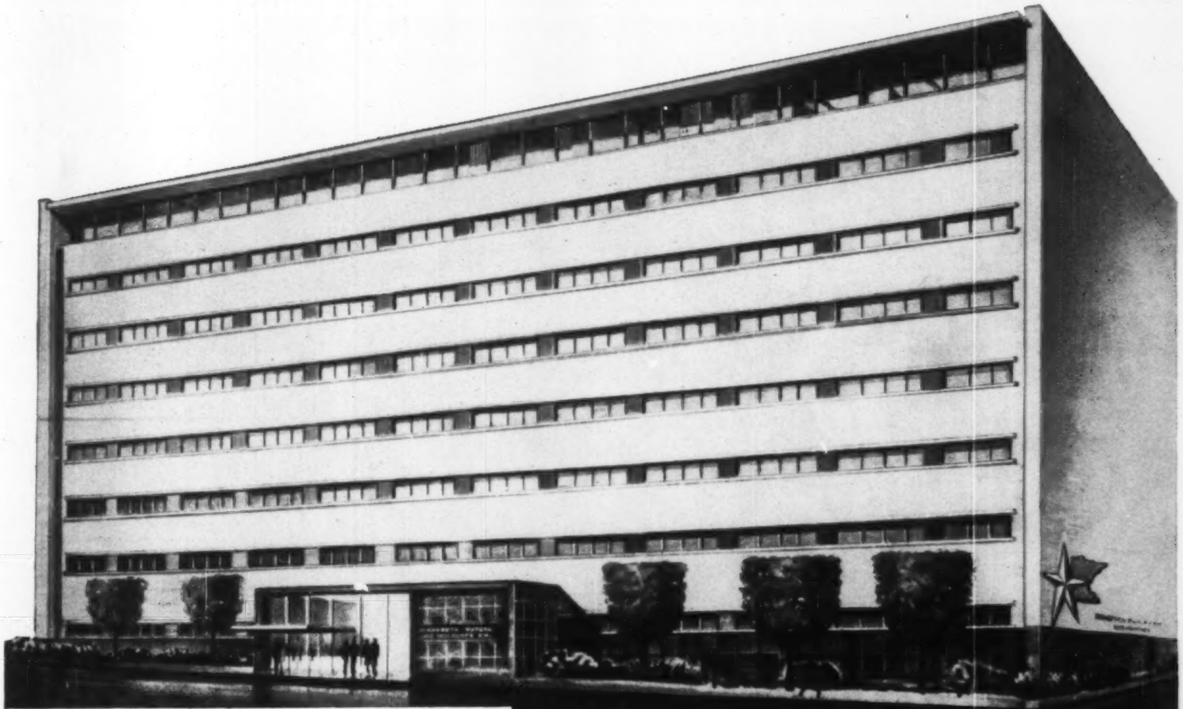
By standardizing on Ingersoll-Rand Motorpumps you are offering your customers modern, efficient pumps designed specifically for air conditioning systems. Today, on all types of installations, thousands of Motorpumps are delivering the maximum in efficient, trouble-free operation.

Ingersoll-Rand
11 Broadway, New York 4, N.Y.

Motorpumps are available from ¼ to 75 horsepower. Write for our latest literature covering the Motorpump for air conditioning service.

9-594

Here steel pipe snow melting makes the "big thaw" start with the first snow!



They have real *winters* in St. Paul! But no matter how heavy the snowfall, the sidewalks at the Minnesota Mutual Life Insurance Company's home office building will be automatically cleared by a Steel Pipe Snow Melting System.

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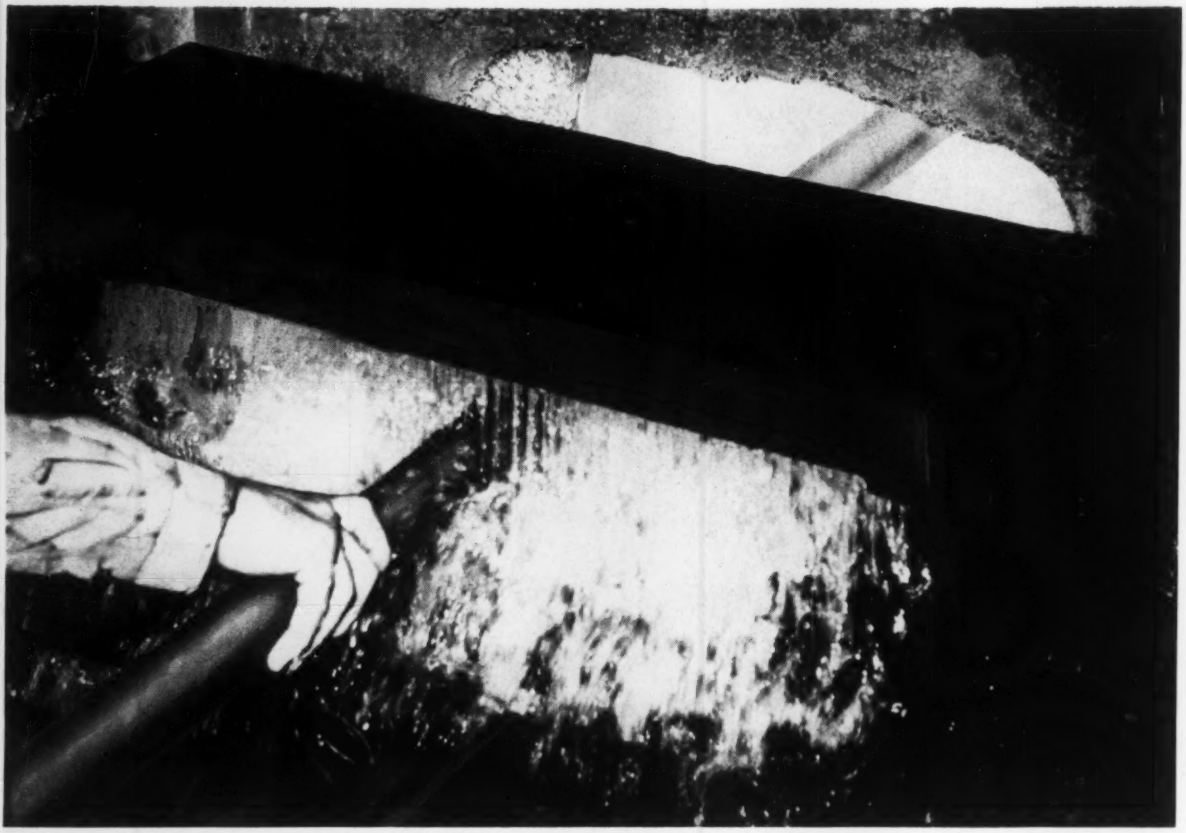

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The Editors' Pages

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Building Outlay Reflects Year-End Seasonal Decline

. . . but new highs set for November

THE VALUE of new construction put in place declined seasonally in November, but the $4.1 billion expended set a new record for the month and was 4 percent above November 1956, according to the U.S. Depts. of Commerce and Labor.

On a seasonally adjusted basis, November 1957 outlays were at an annual rate of $48.5 billion.

During the first 11 months of 1957, new construction expenditures amounted to $43.6 billion, topping 1956's first 11 month total of $42.5 by 2 percent and virtually assuring a new annual record of over $47 billion for the year.

Private construction decreased 4 percent from October to November, and public outlays were down by 17 percent. But totals for both of these were at new November highs. ‡

Maintenance Contract Stressed as Sales Tool

. . . at RACCA convention

MAINTENANCE CONTRACTS on air conditioning installations are easy to sell and help to spread the peak of service work over the entire year, said Walter McCarty, McCarty Bros. Equipment Corp., River Forest, Ill., at the 12th annual convention of the Refrigeration and Air Conditioning Contractors Association. He recommended that air conditioning contractors not overlook the advantages of such contracts.

A form letter enclosing a maintenance contract for the owner's signature, sent out at the end of the one year owner's guaranty period, gets a 50 percent return, he stated. Owners who do not reply are called on, and are "easy to sell" a contract, he reported.

The maintenance contract his firm uses covers labor, parts at 15 percent under list, and gas at half price. It provides for overtime payments for labor performed outside of regular working hours. Jobs covered by maintenance contracts are checked four times a year.

Cost of a maintenance contract depends on the type and make of equipment, its age, etc., and this cost is determined by a check of the installation when it is first put under contract.

In response to a question from the floor, Mr. McCarty said a typical figure for a maintenance contract on a packaged unit five or six years old might be $70 a year. His firm bills for the contract monthly, quarterly, or yearly, as the individual customer may prefer. A 5 percent discount is allowed for payment a year in advance.

Most of his firm's work is air conditioning and heating. His organization used to do quite a bit of commercial refrigeration, but is getting away from it, he said, as it was found to be difficult to serve both the air conditioning and commercial refrigeration fields. Meat cases and other equipment in food stores and refrigeration equipment in restaurants which must be kept in operation 24 hours a day pose special problems, he mentioned.

In commenting briefly on maintenance contracts, Harvey Miller—of Murphy & Miller, Inc., Chicago—warned that contractors should not be fooled by high gross profit figures quoted on maintenance contract work, as the expenses of keeping the necessary records and scheduling the service work are high.

Charles L. Walling, Los Angeles, was elected president of the association, and Armand Cowan, Miami, was named first vice president. W. L. Long, Chicago, served as general chairman of the convention. ‡

Lack of Air Conditioning Is Expensive Commodity

. . . cheaper with than without it

WHAT DOES lack of air conditioning cost the government?

A few years ago, before the benefits of air conditioning were as widely known and appreciated as they are today, it would probably be figured as costing nothing.

But here are some facts uncovered by Carrier Corp:

To send 13,789 government workers home from six different buildings in Washington, D. C., early one day during July, it cost more than $82,000. This is money spent for which there was no return.

This figure can be magnified many times over by government offices in Washington and across the nation. In the nation's capital, it is estimated that approximately 70 percent of federally owned or leased space is now air conditioned. But for all such area outside of Washington, less than 10 percent is so equipped.

Cloud Wampler, chairman of the board of Carrier, notes that the problems faced by the government in this respect are no different than those faced by private industry.

Referring to his many years in the financial world, he stated, "No executive could justify an expenditure for air conditioning on the basis that it makes a pleasant environment. There has to be a payoff. Returns come in the form of lower labor turnover, less expensive worker recruitment, fewer employee errors, less time lost and a higher level of output." ‡

Request ASA Standards For Heat Exchangers

. . . by chemical manufacturers, users

AN ANNUAL SAVING of $3.9 million to the chemical industry alone is possible if national standards are developed for heat exchangers, it was revealed at a conference of manufacturers, users, and others concerned, at the offices of the American Standards Association recently.

The conference recommended that the American Standards Association establish a project for developing American Standards covering heat exchangers. Such a project would cover shell and tube heat exchangers of the following types: fixed tube sheet with or without a shell expansion joint, U-tube, internal floating head, outside packed floating head, and the kettle type reboiler. ‡

Simplification Answer to 'Why Johnny Hates Math'

. . . committee formed in that direction

SPUTNIK, Muttnik, Pfftnik, and Whatnik have intensified the interest in better teaching of mathematics and science in U. S. secondary schools.

But even before the launching of the first earth satellite, industrial leaders, educators, and engineers had pretty well concluded that something must be done to solve the problem of "Why Johnny Hates Math" and to increase the number of secondary school graduates sufficiently well grounded in mathematics to pursue scientific and engineering studies in college.

Part of the difficulty is caused by a confused system of symbols and terminology. As Dr. Karl Menger said some months ago in *The Mathematics Teacher*, "The time has come when it must be frankly admitted that some mathematical processes are successful . . . . . in spite of obscure foundations, ambiguous expressions, and lack of articulateness."

It is, therefore, of particular interest that several associations in the building field have established the "Chicago Committee for the Simplification of Mathematics" in order to contribute—as a patriotic measure—to solving the problem. The groups include the Chicago Association of Consulting Engineers, the Chicago chapter of the American Institute of Architects, the Ventilating and Air Conditioning Contractors Association of Chicago, the Builders Association of Chicago, and the Building Construction Employers Association.

A prime objective of the committee is to obtain from educators the necessary cooperation to evaluate a newly simplified approach to calculus, which would consider calculus to be a trigonometric procedure.

Developed by John J. Aeberly—a member of the Chicago Association of Consulting Engineers and chief of the Bureau of Heating, Ventilation, and Industrial Sanitation of the City of Chicago—the new method is believed by the committee to have great promise to both students and teachers of mathematics.

It is understood that a paper by Mr. Aeberly on this new approach is soon to appear in one of the educational journals. ‡

Fan, Compressor Motors Use Same Capacitor

. . . power factor improved

A NEW air conditioning system, with the fan and the compressor motors operating from a single starting capacitor, was announced at the recent East Central and Middle Eastern district meeting and Air Transportation Conference of the American Institute of Electrical Engineers.

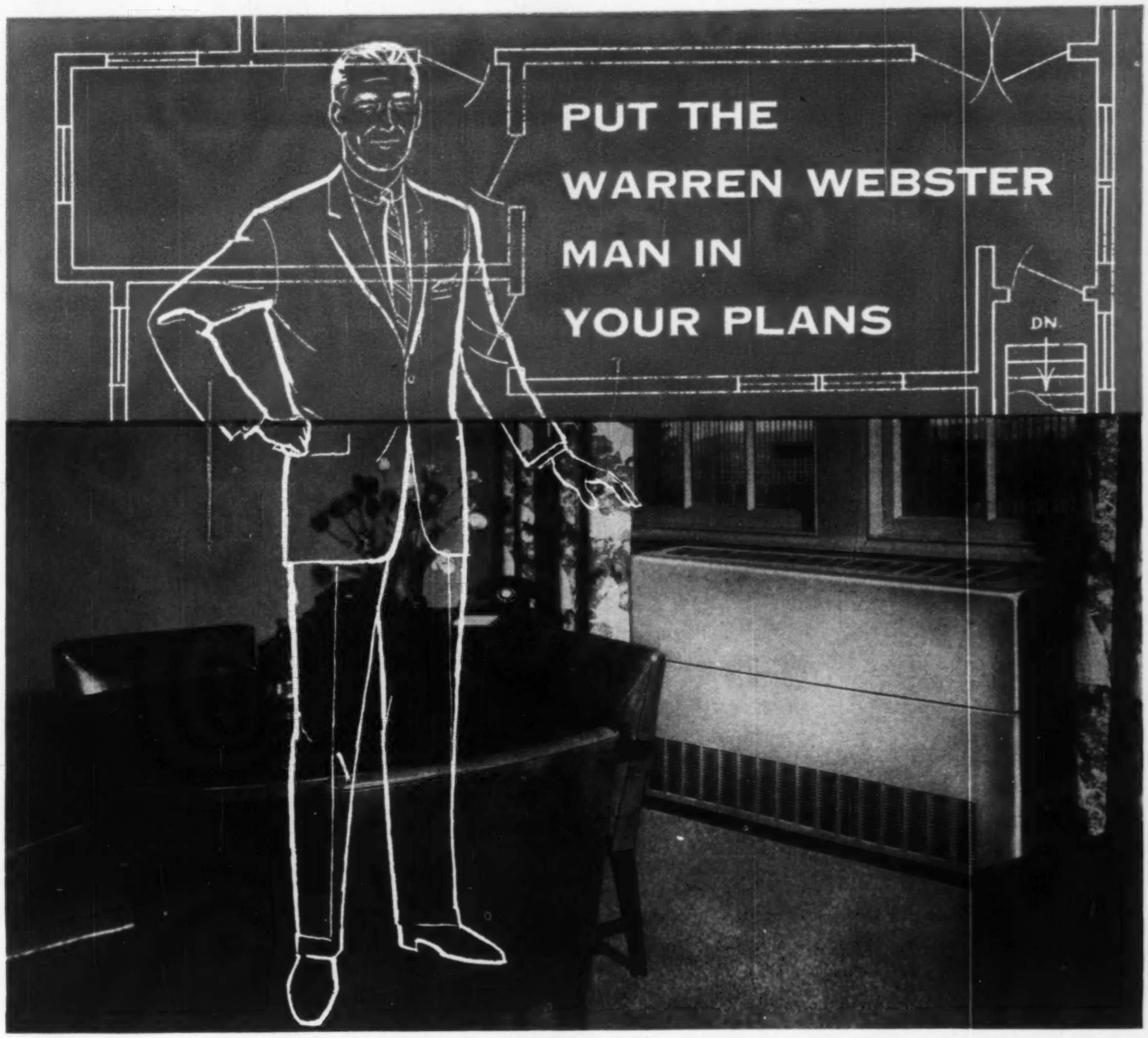
The new system's "essential merit appears to be saving of an oil capacitor without any disadvantages," said Prof. S. S. L. Chang, of New York University. He listed its advantages as improved power factor, no detrimental effect on compressor performance or safety, standard controls in single as well as two speed operations, and the use of concentrated motor windings to reduce the motor cost.

There are two possible ways to operate a fan motor with the running capacitor of a compressor motor, he said. The auxiliary winding of the fan motor may be connected with the auxiliary winding of the compressor motor, or it may be connected in series with the latter. ‡

"Quote"

"If there are too many irons in the fire, none of them gets hot."

— Anon.



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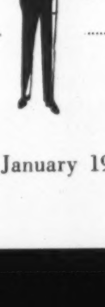

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"Open for Discussion"

• WE FOLLOW HERE each month the practice at engineering society meetings of providing an "open for discussion" period. You are urged to take part. Just address your comments to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

Design Better Insulated Walls For Economical Heating

MY STUDY of insulation, *Operating Records of 20 Hospitals Show Why Insulation Is a Rich Investment in Comfort, Economy*, in the June issue and commented upon on these pages in September, was based on a few widely varying, widely scattered hospitals with only three things in common. These are adequate insulation, reduced heating plants, and low fuel consumption.

The insulated walls 14 to 18 in. thick were effective but extravagant in cube. With today's materials and methods better curtain walls can be designed with a fraction of this thickness.

Effective insulation is still widely neglected. For example, in a recent report of the Princeton School of Architecture entitled *Curtain Walls of Stainless Steel*, the walls in 28 buildings are described. In only 16 of these is the heat loss coefficient given. Six have *U* factors ranging from 0.11 to 0.16 and nine from 0.18 to 0.24.

Architects aim at a *U* factor of 0.085 in walls. Why should not equal protection be built in all types of modern buildings? If 2 in. of insulating batts, costing about 40c per sq ft, had been used in the Princeton group, the heat loss in most instances could have been cut in half.

In my article it was shown that 20 hospitals might have saved $900,000 a year in operation if their buildings and power plants had been as efficient as the lowest cost insulated hospital. What the nation could save in heating its new hospitals, office buildings, and multiple housing units by providing better walls and windows is interesting to speculate. With glass curtain walls and year 'round air conditioning the potential savings would be fantastic.

CHARLES F. NEERGAARD
Hospital Consultant, Retired
Waccabuc, N. Y.

Soot Problem Can Be Alleviated If Precipitators Do Their Job

REGARDING the question *What Causes Soot Problem in High Pressure Air Conditioning?*, in the September issue, it is my opinion that the soot particles that are being discharged are atmospheric contamination, and that agglomeration is probably the process that is converting the submicronic sized particulates into the large sooty particles.

The oil curtain type filters could be contributing to the result—even adding to the dirt under some conditions of operation and maintenance. If the electrostatic precipitators were doing the job of which such equipment is capable, there would be practically none of the sooty material, neither natural atmospheric contaminants nor agglomerates, getting through the precipitator. There would then be no such discharge as is now encountered.

CLIFFORD S. STEPHENS
Professional Engineer
Pittsburgh, Pa.

How Neutral Condition is Obtained Doesn't Matter, If Fan is Right Size

IN COMMENTING on my article, *Pressurized Firing: When, Where, How Do We Use It?*, on these pages in the November issue, Lee P. Hynes and George G. Nash bring out a point that possibly could have been carried into more detail in the article.

Whether the neutral condition of the firebox and breeching of the boilers is obtained by means of natural draft produced by a stack or a combination of stack and induced draft fans does not make a great deal of difference. There are points to be said in both directions, in my opinion.

A natural chimney is, of course, subject to variations produced by varying ambient temperatures and, in certain cases, changing winds which can produce down drafts and other conditions. The use of an induced draft fan makes possible mechanically the insurance of a constant draft value.

In day to day operation from an equipment selection standpoint, however, one of the most common problems is the lack of understanding of the correct sizing of induced draft fan systems. Invariably there are two common mistakes in this direction. Either the fan is grossly oversized, which makes it impossible to regulate the draft within desired limits, or it is of too small diameter and too high a speed, which creates a problem of unbalanced output.

If, however, the induced draft fan, used either independently with the so-called stub stack or in a combination natural draft and induced draft, is correctly sized and has at the minimum barometric draft control and on the larger size jobs, say above 150 hp, a complete draft control system, the idea from a mechanical standpoint is very sound and completely justified.

It is an interesting point, as brought out by Mr. Nash, that the use of a draft inducer can answer the objection from an architectural standpoint of stack height both in lowering capital cost as well as in improving architectural appearance.

Robert W. Pixler
Vice President
The Mettler Co., Inc.
Los Angeles, Calif.

Suggest High Vacuum on Steam Main As Solution to Piping Stresses

I am very much interested in the subject, *At What Rate Should Steam Lines be Heated to Avoid Damage?*, which is discussed in the November issue.

I would suggest that a high vacuum be pulled on the steam main before admitting any steam. Here is why:

Ordinarily, steam at a pressure slightly above atmospheric is used of necessity. This means a steam temperature of 220 to 225 F, whereas the temperature of the main will be about 70 F, or possibly even lower. There is, therefore, a temperature difference of 150 F between the pipe and the steam. Since steam will travel faster along the top of the pipe than along the bottom, stresses are caused.

If a 26 in. Hg vacuum could be pulled on the main, the steam temperature would be approximately 130 F, or only 60 F more than the pipe. The steam would travel faster, and there probably would be less stratification. The higher the vacuum, the lower the steam temperature. Once the main is warm the pressure could be built up fairly rapidly.

A high vacuum easily could be obtained in a power plant by using existing condensing equipment.

T. H. Rea
Armstrong Machine Works
Three Rivers, Mich.

How Far Should Wells Be Spaced For Indirect Cooling Water Supply?

I found the article *Planning to Use Water For Air Conditioning Design?*, by John F. Hoffman, in the August issue, very interesting and informative.

I am very much interested in the process of using water for air conditioning, particularly where the water is not used directly. I would like to know if information is available on how far apart water wells should be placed where the water is pumped from a well and back into a discharge well in the ground.

I assume the distance would depend to some degree on the type of soil the water passes through, the exposure of the land surface, and the speed with which the water passes through the ground.

I would appreciate having any information that Mr. Hoffman or others might have about this.

E. H. Harris
Co-Publisher
The Palladium-Item
Richmond, Ind.

The Author's Reply—Spacing a supply well and a recharge well to prevent recirculation involves consideration of a number of factors. Some of these are the movement of ground water away from the site under a natural gradient, the character of the water bearing material, and the rate at which the supply well is pumped. The rate of ground water movement away from the site depends upon the permeability of the water bearing material, the slope of the water table, and the porosity of the aquifer.

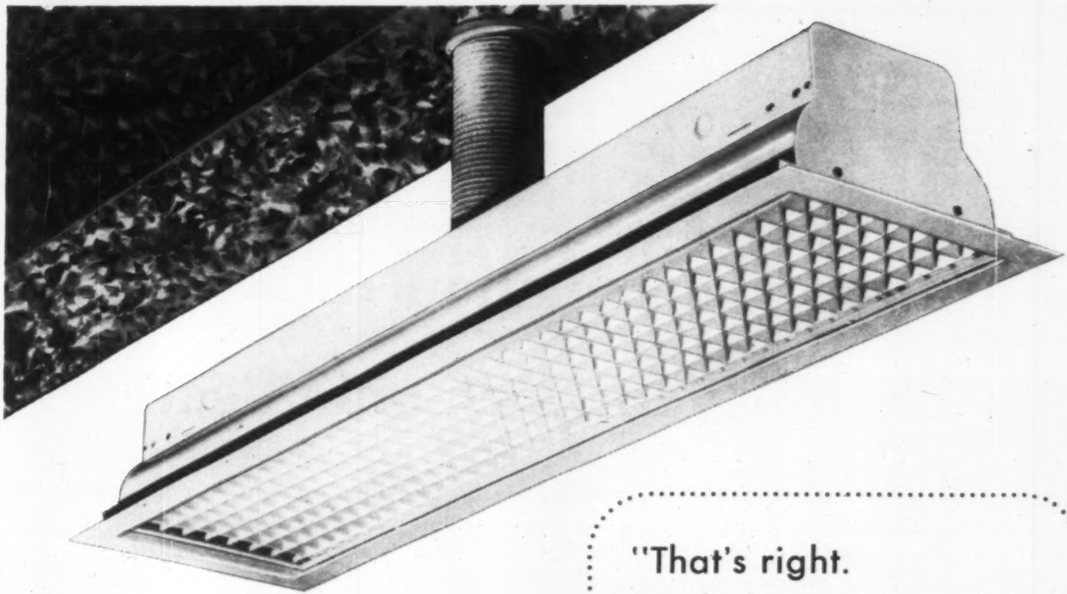
Simple as it might seem to evaluate these conditions, nature is not orderly, and trying to include the variations and departures of existent conditions from the ideal makes formulation of the problem difficult. In many cases sufficient information is not available to permit computation of the proper well spacing and, therefore, rules of thumb are preferred.

The New York State Water Power and Control Commission recommends that the recharge well be placed at least 100 ft down-gradient from the supply well. Under certain geologic conditions and rate of pumping even this spacing is not sufficient to prevent recirculation. The best overall rule is to separate the wells as far as economically feasible, making sure the diffusion well is down-gradient. Determining which direction is down-gradient can be difficult, and without a specific area in mind a simple rule of thumb cannot be given for its determination.

If during the drilling of the supply well a layer of clay or other impermeable material is indicated, it may be possible to physically retard the return of the spent cooling water to the supply well by screening the diffusion well above this clay and the supply well below. A good practice, in any case, is to screen the diffusion well in the upper region of the aquifer and the supply well in the lower region — the principal being that the increased vertical separation will inhibit the return flow.

As you are interested in using well water for indirect cooling, you will have a greater latitude in temperature rise than if the water was circulated directly through cooling coils. Consequently, by proper design of your equipment it may be possible to offset the decreased heat capacity of the water due to a temperature rise with an increased flow.

John F. Hoffman
Civil Engineer
Lynbrook, N. Y.



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Question of the Month

What Vapor Transmission Rules Apply When Planning for Dehumidification?

This question was asked previously in Heating, Piping & Air Conditioning and is repeated here, along with an answer that has been received from readers. Other answers or comments for publication are invited.

"If we consider a sealed room, in which the air is at a low dew point temperature, and we suddenly open a relatively small door to the outside where there is a high dew point temperature,

"a) At what initial rate will water vapor leave the room per sq ft of opening?

"b) Does this rate vary with time elapsed after the door is opened? If so, what is the relationship?

"c) How can the time required for the entire room to reach outside vapor pressure be calculated in terms of room volume and dimensions? It is assumed that there is no air movement through the doorway and that inside and outside air are at the same temperature such as 85 F with an initial vapor pressure difference of 0.4 in. Hg.

"d) If it is now assumed that air flows outward through the doorway, at what velocity must it flow to prevent inflow of water vapor?

"Answers and comments from other readers on this will be greatly appreciated."—H. P. W.

Extend Principles for Small Openings To Compute Larger's Transfer Rate

THE WATER VAPOR transfer rate through holes has been studied to a limited extent on rather small holes in comparison with the opening suggested by the question. However, since the holes tested were very large in comparison with the mean free path of the molecules, an extrapolation to larger sizes seems justified. Such an extrapolation indicates a permeance of 800 gr per sq ft per hr per psi vapor pressure differential.

The original tests were designed to limit, if not eliminate, convection of air through the opening. This is consistent with the assumption in the problem that there is no flow of air through the opening.

The air conditions are given or calculated as follows:

	Inside the room	Outside the room
Temperature, F	85	85
Vapor pressure, in. Hg.	0.2035	0.6035
Barometer, in. Hg.	29.921	29.921
Relative humidity, percent	17	50
Dew point, F	35.0	64.1
Moisture content, gr per cu ft	2.16	6.36

For the sealed room, $PV = wRT$ for the water vapor as well as the air. Volume, temperature, and the gas constant, R, are constant. The equation can be written $P = (RT/V)w$. Converting P from pounds per square foot to inches of mercury, and w from pounds to grains gives the following equation:

$$144 \times 0.491 \times P = (1545 \times 545 \times w)/(18.01 \times V \times 7000)$$

or

$$P = 0.0945\ w$$
$$dP = 0.0945\ dw$$

But dw is the rate at which the vapor is flowing through the opening into the room. This can be expressed as the product of the permeance of the opening, the area and the vapor pressure differential. The tests mentioned earlier indicate this to be

$$dw = 800 \text{ gr per sq ft per hr per psi} \times A \times (P_o - P)\ dt$$

where P_o is the vapor pressure outside the room and P is the instantaneous vapor pressure in the room.

Converting the permeance to use minutes and inches of mercury it becomes

$$(800/60) \times 0.491 = 6.55$$

(*Continued on page* 148)

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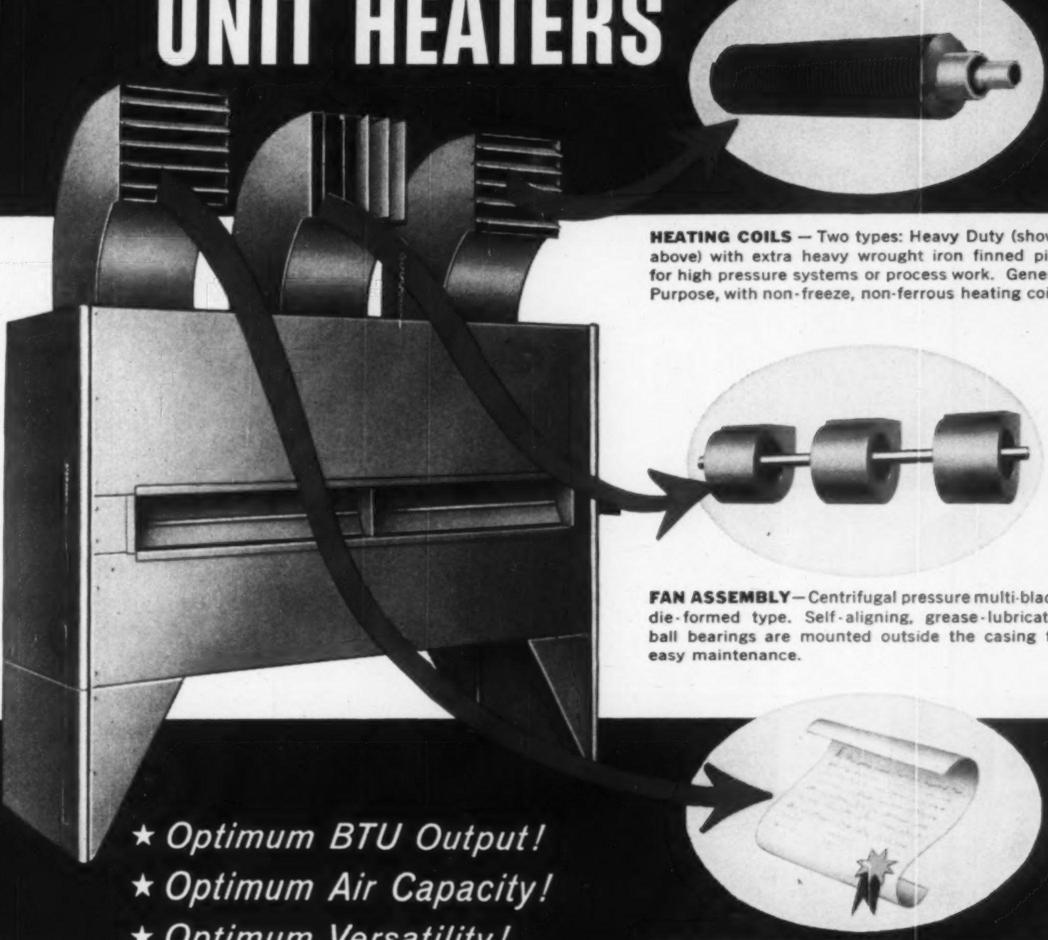

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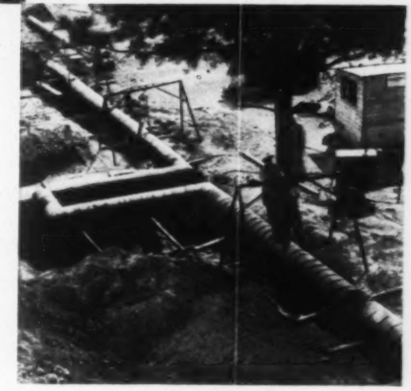

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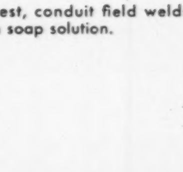


RIC-WIL INCORPORATED PREFABRICATED **INSULATED PIPING SYSTEMS**

BARBERTON, OHIO

IN CANADA: THE RIC-WIL COMPANY OF CANADA LIMITED

(Continued from page 144)

The transfer rate equation then becomes

$$dw = 6.55\ A\ (P_o - P)\ dt$$

The initial rate at which water vapor will enter the room will be

$$6.55 \times 1 \times (0.635 - 0.2035)$$

or

2.62 gr per min per sq ft of opening.

As the vapor flows into the room the vapor pressure will increase. This decreases the vapor pressure differential which decreases the water vapor transfer rate through the opening. Until the pressures are nearly equal it appears reasonable to accept the coefficient of 6.55 gr per sq ft per min per in. Hg as being constant.

To calculate the rate of flow at a given time it is necessary to know the vapor pressure within the room. To calculate the pressure within the room it is necessary to assume that all water vapor passing through the opening remains in the space and is not absorbed nor adsorbed by the walls of the room or any hygroscopic contents. (Absorption can be corrected for, if the ratio is known. This will be shown later.) We expressed the increase in pressure as

$$dP = 0.0945\ dw$$

and later expressed

$$dw = 6.55\ A\ (P_o - P)\ dt$$

Substituting, we have

$$dP = 0.0945 \times 6.55 \times A \times (P_o - P)\ dt$$

This equation, as it stands, is somewhat unrealistic in that it implies 1 cu ft of room space for each square foot of opening. We can correct for this by dividing the above equation by the volume of space per square foot of opening, or V. Furthermore, if some of the water vapor is absorbed the rate of pressure rise will be slowed in proportion to the amount of vapor absorbed. This is expressed as R. Our equation is now

$$dP = R \times (0.0945 \times 6.55/V) \times A \times (P_o - P)\ dt$$

This can be reduced to

$$dP = (a + bP)\ dt$$

or

$$t = \int (dP/a + bP) = (1/b)\ \log_e\ (a + bP) + C$$

The constants are identified as

$$a = R \times (0.0945 \times 6.55 \times A \times P_o/V)$$
$$b = R \times (0.0945 \times 6.55 \times A/V)$$

in which

A = area of opening, sq ft.
V = ratio of volume of room to area of opening, cu ft per sq ft.
R = Portion of water vapor entering space that remains in the space (not absorbed).
P_o = Water vapor pressure outside of room, in. Hg. This pressure is given and is assumed constant.

If values are assigned to these constants a typical problem can be solved.

A = 1 sq ft.
V = 10 cu ft per sq ft of opening
R = 1.00 (no absorption)
P_o = 0.6035 in. Hg.

$$a = 1.00 \times 0.0945 \times 6.55 \times 1 \times 0.6035/10 = 0.0374$$
$$b = 1.00 \times 0.0945 \times 6.55 \times 1/10 = -0.0619$$

Our equation then becomes

$$t = (1/-0.0619)\ \log_e\ (0.0374 - 0.0619P) + C$$

To evaluate the constant C we solve the equation for $t = O$ when we know P is 0.2035 in. Hg.

$$O = (1/-0.0619)\ \log_e\ (0.0374 - 0.0619 \times 0.2035) + C$$
$$\begin{aligned} C &= 16.18\ \log_e\ (0.0374 - 0.0126) \\ &= 16.18\ \log_e\ (0.0248) \\ &= -16.18\ \log_e\ 40.3 \\ &= -16.18 \times 3.7 \\ &= -59.8 \end{aligned}$$

Substituting in the equation

$$t = -16.18\ \log_e\ (0.0374 - 0.0619P) - 59.8$$

Selecting values of pressure and calculating t gives the following values:

P	t
0.2035	O
0.3000	4.4 min
0.4000	10.9 "
0.5000	21.7 "
0.5800	44.5 "

The substitution $P = P_o$, or 0.6035, in the equation makes it indeterminate, as the $\log_e O$ is negative infinity. This indicates that the two pressures would never quite attain equilibrium although they will be very close to being equal after 1 hr.

Data for the counter flow of air to prevent the net flow of water vapor is scant. The flow of air to maintain a standing differential in water vapor content at the opening may be calculated by the following procedure. The diffusion of water vapor in air is expressed as a rate which is proportional to the concentration gradient. The constant of proportionality is the diffusivity. In English units this is 0.000269 sq ft per sec. The quantity of vapor flowing is

$$N = 0.000269\ dC/dx$$

in which dC/dx is the concentration gradient.

The quantity flowing is also the average velocity multiplied by the difference in concentration

$$N = \text{Vel}\ (C_1 - C_2)$$

Substituting for N yields

$$\text{Vel} = (0.000269\ dC/dx)/C_1 - C_2$$

With a uniform and constant concentration gradient along the distance, X, the equation becomes $\text{Vel} = (0.000269/C_1 - C_2)\ (C_1 - C_2/X)$

or

$$\text{Vel} = 0.000269/X \text{ ft per sec.}$$

If the concentration differential is to be maintained within 1/16 in., the air velocity must be $0.000269 \times 16 \times 12$

$$\text{Vel} = 0.052 \text{ ft per sec.}$$

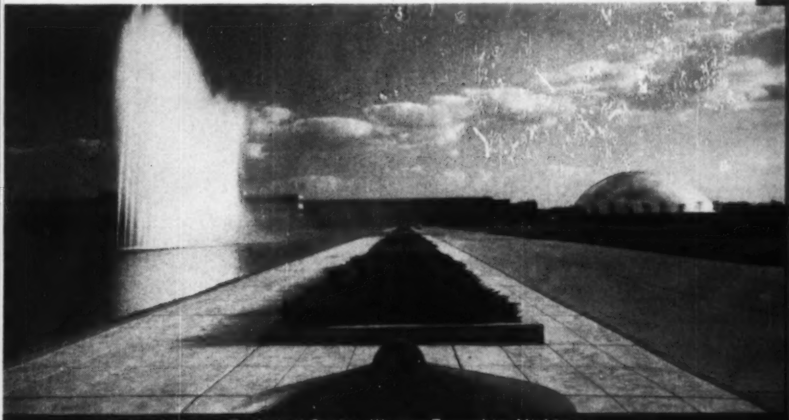
or

3.1 fpm

It is evident that the velocity required varies inversely with the distance over which the pressure drop is permitted to exist. With a ducted opening the velocity can be very low.

PROFESSOR E. R. QUEER
PROFESSOR E. R. MCLAUGHLIN
Pennsylvania State University
University Park, Pa.

COUNT ON WATTS FOR PROTECTION WHERE IT COUNTS



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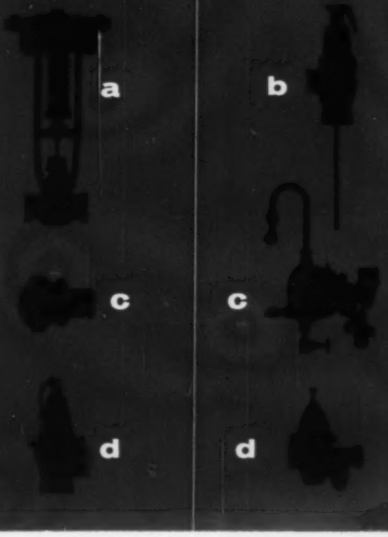

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b Temperature, Pressure ASME Relief Valves
c Boiler Water Level Controls
d Hot Water Heating Specialties

WATTS
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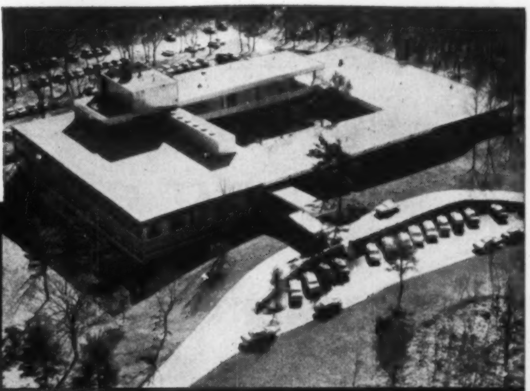
Owners: **Boston Manufacturers Mutual Insurance Company**
and Mutual Boiler and Machinery Insurance Company
Waltham, Massachusetts

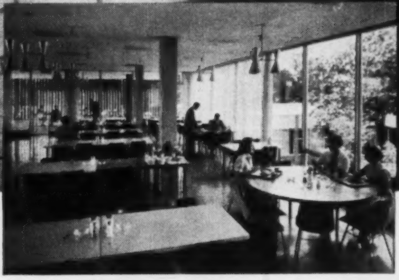
Architects: **Anderson, Beckwith & Haible.**

Mechanical Engineer: **Delbrook Ventilating Co.**

Mechanical Contractor: **C. H. Cronin Co., all of Boston, Mass.**



Air view shows central court.



Above: Reception Lobby.

Above: Cafeteria and Lounge.

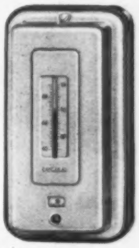
Right: Court, Penthouse and Lounge.

Award Winning Office Building also won Thermal Comfort with

POWERS Quality System of

AIR CONDITIONING CONTROL

This Winner of Significant Architectural Awards is one of the nation's outstanding suburban office buildings. It was a 1957 recipient of the highest building design award of the American Institute of Architects. It also received the Boston Arts Festival Architecture Award and the 1957 Parker Medal for "the most beautiful building in Metropolitan Boston". In addition to "achieving such splendid use of its site and such useful splendor in its central court the building provides an attractive, pleasing environment, comfortable and highly efficient to work in."



Symbol of Economy and Quality Control

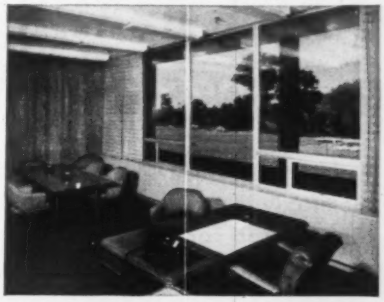
Once set, a Powers pneumatic thermostat, holds temperature constant day after day. It needs no frequent checking or readjustment.

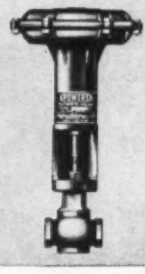
Big Dividends from ideal year 'round comfort are assured here by Powers accurate control of temperature and humidity. It helps workers accomplish more with fewer costly errors, reduces absenteeism, helps hold good workers and attract desirable new employees.

Nine multizone air conditioning units provide heating, ventilating and air conditioning for the office areas. IBM room and cafeteria are served by a special unit. All are Powers controlled including the 250 ton refrigeration compressor which provides chilled water for the air conditioning units. See photo below.

Direct radiation, to offset wall losses during the heating cycle, is divided into 7 zones, each served with compensated hot water. FLOWRITE 3-way valves, controlled by Powers instruments mounted on central panel boards, regulate the temperature of hot water for each zone.

Are You Planning A New Building or modernizing an old one? If so, ask your architect or engineer to include a Powers Quality system of temperature and humidity control. They have been time-proven dependable and economical in thousands of prominent buildings since 1891.

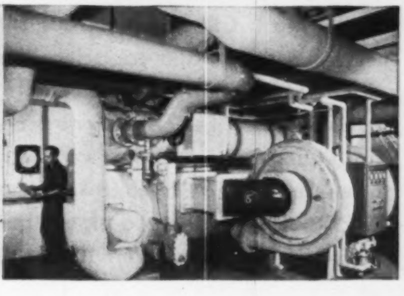




Powers FLOWRITE 3-way Control Valve.

Left: One of two central panels with Powers Series 100 Temperature Indicating Sub-Master Controllers. Pneumatic selector switches provide manual operation when required.

Right: Chilled water supply for air conditioning units is regulated by a Powers Temperature Recording Controller.



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The type CSI NASH Heating Pump sets a new standard of economy

Now a Nash quality Vacuum Heating Pump can be economically installed and operated on any steam heating job. Engineered for high performance and low installed first cost, this new pump still makes use of time tested Nash principles of operation.

The Nash CSI has generous air capacity and features a wide choice of water capacities and discharge pressures. The right combination of capacities is at hand to match the requirements of the job. It is no longer necessary to pay extra for a pump with excessive water capacity, excessive discharge pressure, or in an attempt to get adequate air capacity.

With this advanced design, Architects, Engineers and Contractors will find answers to many heating system problems. Send for bulletin now.

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3. **ECONOMY OF OPERATION**
4. **ECONOMY OF MAINTENANCE**

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Ingenious Construction Scheme Hoists Steam Lines Skyward

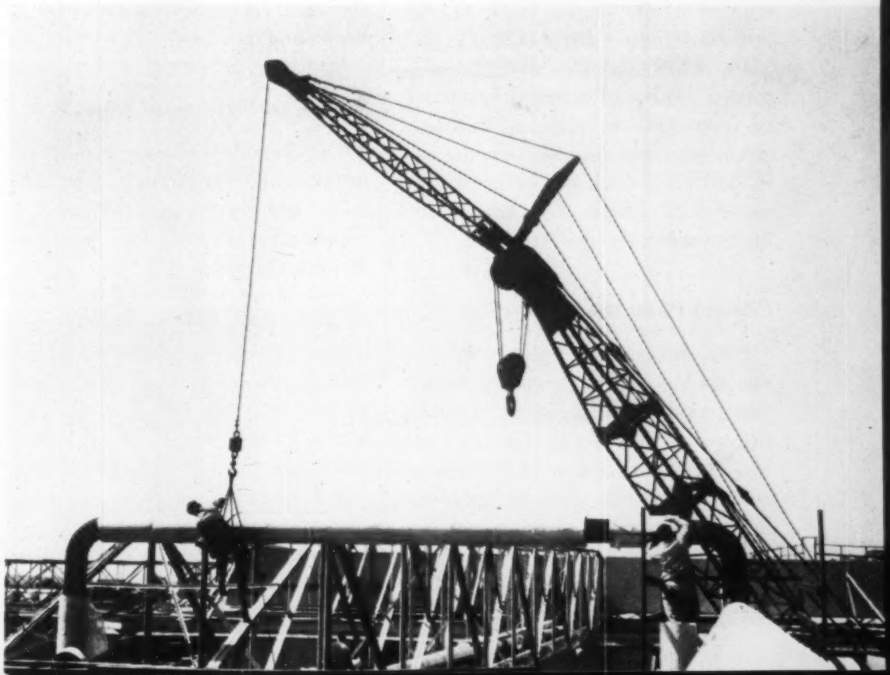
Aircraft plant's rapid expansion made ungainly heating system expensive proposition. To maintain plant production without interruption, steam lines were lifted from underground tunnels onto rooftop trusses. Convair's incremented "three-year plan" replaced 22 boiler, five boiler room system with five boiler central steam plant.

BY E. W. WINCHESTER
Plant Engineering Dept.
Convair Div.
General Dynamics Corp.

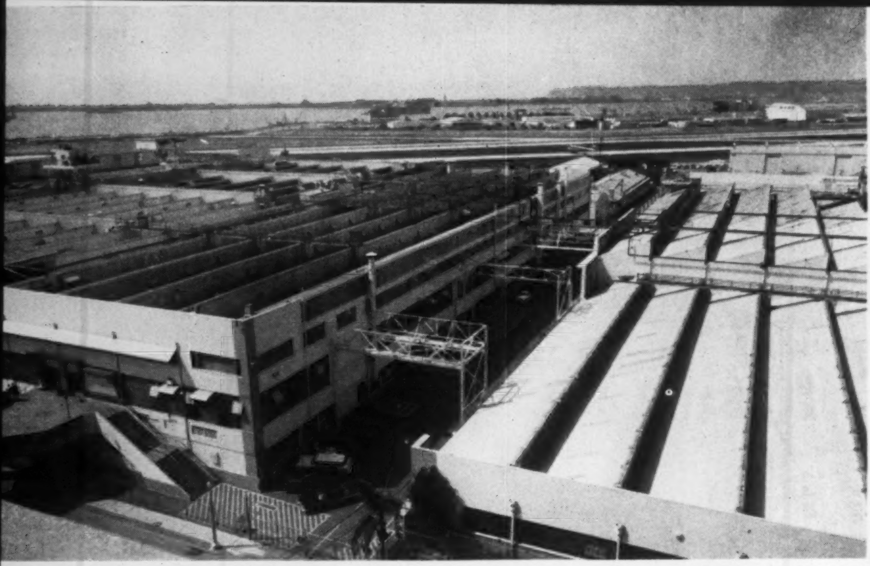
WHY PUT steam lines on rooftops? We did it to save time and money, and to continue aircraft manufacturing without interruption.

In 1935 the company moved from Buffalo to a single, newly erected, 225,000 sq ft building on the edge of San Diego Bay. Since then the main plant has been expanded from this single structure to a group of 12 main buildings, plus over 50 auxiliary buildings. In all, the facilities total 1.8 million sq ft of ground floor space.

The original building included a small boiler room. Two low pressure boilers served the needs for heating and a small amount of processing. A second structure built later was



ONE PROBLEM in installing steam lines was spanning gaps between buildings. This was done using monorail bridge, shown here



ROOFTOP DISTRIBUTION SYSTEM view shows condensate lines following high edge of change in roof elevation. Steam line is behind, parallel to walkway

also provided with its own heating boilers.

The greatest plant expansion occurred during World War II. Five major buildings totaling 975,000 sq ft were erected. To serve these a central boiler plant was provided. The boilers were again low pressure and the steam was distributed to each building through four tunnels.

At this same time the original building was expanded to 500,000 sq ft. Additional low pressure boilers were installed in its existing boiler room.

In 1951 a new engineering building was erected. Separate boiler room equipment for this building included two steel firebox boilers that operated at 125 psig. Steam pressure was reduced at the boiler room to 10 psig for building distribution.

By 1953, because of increased process loads and changed functions of buildings, we realized that the steam plant was inadequate and costly. It consisted of five boiler rooms housing 22 boilers. Operating costs far exceeded services rendered.

Central Plant the Answer

Late that year a complete survey was made, and the results indicated that a new centralized steam generating system would pay for itself in less than five years. Accordingly, authorization was given to complete the new system in three annual increments.

The existing central plant building was used. The first year's work consisted of removing four of the old boilers and installing two of the five proposed new boilers. In addition, the hot process water treatment plant was installed, and one tunnel branch line was converted to a line suitable for boiler pressure. A reducing station was installed at one of the major buildings.

The new boilers are 40,000 lb per hr steam packaged water tube type with full water wall furnaces. Design pressure is 160 psig. Operating pressure is 120 psig.

Burners fire either natural gas or steam atomized fuel oil. Safety controls are electronic, and the automatic combustion control system is pneumatic. The basis for control is steam and air flow.

Where to Put Steam Lines?

The second year's work program included the installation of a third boiler and the extension of the distribution system to include two more major buildings.

Several major decisions were necessary at this point. To continue tunnelling between buildings would require replacement of all steam and return piping between buildings then served by the central plant. Furthermore, the piping within buildings would require extensive overhead work. Factory operations could not be curtailed. Welding, cutting, and the possibility of falling tools would not only be a potential detriment to aircraft quality, but also a critical personnel safety problem. Of necessity, work would have to be on a convenience schedule involving premium time.

As an alternate, the steam lines took to the air. An existing tunnel pipe of adequate size was remodeled for operation at boiler pressure. A new return pipe was also installed in the tunnel. At the building end of the tunnel both the steam and return lines turn south toward the remaining buildings. Trusses, already installed to support an outside monorail, were used as the basic support members.

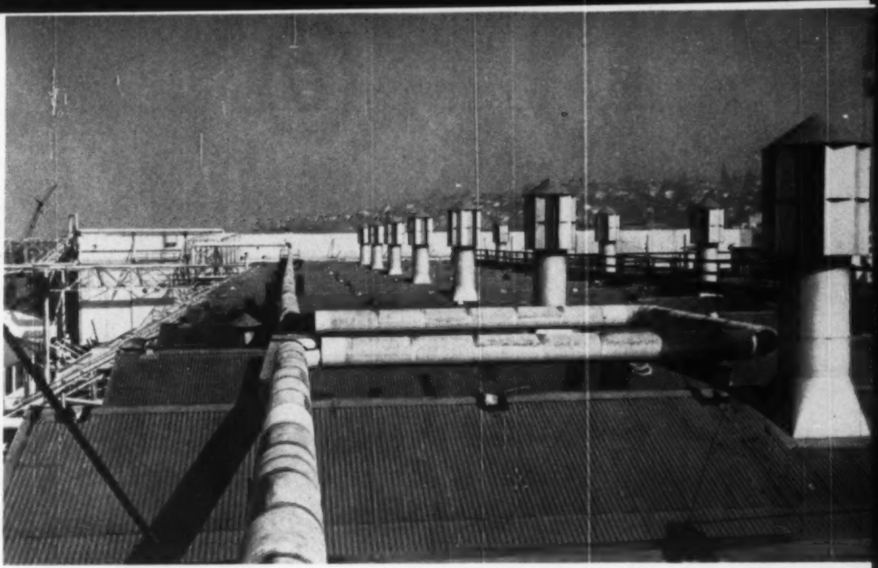
The problem of spanning the 175 ft between the first building and the next was solved by again using an existing monorail bridge between the two. At this second structure the return line was once more supported by monorail truss work. At the center of the building the line was routed inside and over the old boiler room.

Then luck ran out. The monorail trusses were too light to support the heavy steam line. Here the steam line runs across saw-tooth roof trusses. Pipe stools were welded directly over vertical members of the trusses. Except at anchors, the pipe supports include a covering protection saddle bearing directly on a plate welded to the stool. The second year's steam line work terminated at the reducing station at the center of the building.

Reducing Station out of Reach

A unique erection problem was solved at the reducing station. This was the only spot out of reach of a truck crane. A junior bridge crane was erected. Piping components weighing up to 1000 lb were installed in overhead positions by two men. The crane was left in place for future maintenance operations.

Three condensate pumping units were refitted with new impellers to produce the higher pressure required to send the condensate back to the central plant. A fourth unit required new pumps.



GLASS FIBER PIPE COVERING is used throughout project, shown here. Note expansion loop in steam line, power roof exhausters at right

The third year's operations completed the project with the installation of two more boilers and the extension of the distribution system to include all the buildings.

The rooftop steam line was extended south, and again it was possible to use an existing truss to span the 50 ft gap between the adjacent building. The condensate line was offset eastward and again outside to the high edge of a change in roof elevation.

Cut Inside Work 90 Percent

To avoid overhead work for the offset, use was made of a transverse overhead steam line abandoned during the second year's operation. This opportunity repeated itself in the next building. An internal steam distribution pipe was used to join the roof line with the ground floor pump. This scheme eliminated 90 percent of the inside work in an area where aircraft are designed.

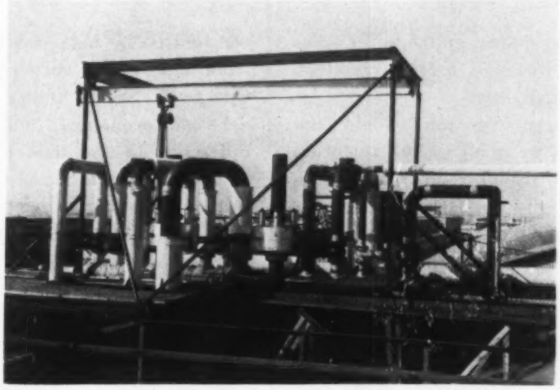
The steam and return lines were continued over the roof to the last building where only minor alterations were required to tie in to the existing 125 psig system.

Glass fiber pipe insulation is used throughout the project. Covering of the insulation was no immediate problem, so each year's increment could be weatherproofed as men were available.

Each of the 10 reducing stations in general consists of a steam pilot operated reducing valve between two gate valves and a globe valved bypass. One of the larger stations contains two of these combinations. Relief valves are of the fabricated multiport type.

One station uses two tandem air operated reducing valves which are remote controlled from a pilot located in a building 200 ft from the central plant. This type of valve was selected to avoid extensive modifications to the tunnel and the existing 18 in. steam line suitable for a maximum pressure of 100 psig.

An interesting control scheme is used with these valves. The valves close on air failure. Lever operated three-way valves cut off the air and vent the diaphragm. Positioning of the three-way valves affords a choice of either, both, or no operating valves. The slight leakage through the double seated reducing valves is always absorbed by a continuous demand within the building. At extreme loads, the 18 in. pipeline acts as part of the reducing system. The relief valve is adjacent to the pilot and is not influenced by fluctuations in pressure immediately downstream from the reducing station.



REDUCING STATION on original building posed problem since it was out of reach of truck crane. Solution was junior bridge crane, now permanent installation

Business as Usual

Each year's increment was completed on or ahead of schedule. Shutdowns were rare and at no time was production delayed by piping installations.

Altogether, 6400 ft of new distribution lines were installed. A total of 1600 ft of existing lines were modified for re-use, of which 1000 ft were in tunnels. Pipe sizes ranged from 18 in. down to $1\frac{1}{2}$ in.

Five boilers replaced 22 boilers and doubled their capacity. One boiler house and 10 pressure reducing stations replaced five boiler rooms. The operating force was reduced from 27 men to nine men. Fuel savings were obtained by using No. 6 fuel oil, instead of No. 5, and propane gas as standby fuels for the interruptable natural gas. ∓

How Convair air conditioned its flight data reduction building will be discussed in another article in an early issue.

1958: Will It Be a Good Year?

- ***Foresee 3.5 percent increase in total business volume.***
- ***Dollar outlays for new construction will rise to $49.6 billion.***
- ***But rising costs will account for part of this.***

OPINIONS *expressing the 1958 business outlook are mixed.*

It is estimated that the gross national product will increase by $15 billion to a new record high of $449 billion, eclipsing last year's record $434 billion by 3.5 percent. However, this increase will be marked by continued inflation via rising materials costs and hourly wage increases.

Economists show concern; generally, businessmen don't. Obviously, a tapering off must come sooner or later. There must be a leveling point—a plateau. When this happens, is business necessarily bad? *It is interesting to note that a 10 percent—or even a 20 percent—cutback over the next couple of years would still leave plant and equipment outlays higher than 1955, which in its day was a new record.*

Estimates are that $49.6 billion will be spent on new construction this year—5 percent more than in 1957. Whether or not this increase will be offset by increasing costs is difficult to determine.

In any case, "the law is on our side." As long as the population continues its rapid growth there must be provision made for facilities—housing, schools, hospitals, etc.—to take care of the increase. This alone provides an endless market for the services of the heating, piping, and air conditioning engineer and contractor, and for the products that go into these structures.

For a closer look at what 1958 holds in store, Heating, Piping & Air Conditioning presents the facts and the opinions of several authorities on the following pages.

Economists Show Concern

THE NATION'S leading business and university economists expect 1958 to be a year of cross currents, with continued inflation pushing the major dollar indicators of activity to new highs, according to the 11th annual survey of economists' opinion, conducted by F. W. Dodge Corp.

The 202 economists participating indicated widespread concern over the outlook for the year. The composite opinion of the economists polled during last October revolved around four main points:

1) Total dollar output in 1958, as measured by gross national product, would rise slightly.

2) Hourly wage rates would continue to go up in all major categories.

3) The cost of living would continue to rise in 1958. Wholesale prices would also go up, but not quite as rapidly.

4) Real output (as measured by the Federal Reserve index of industrial production) will dip in the first half of 1958, and then rise slightly during the last six months.

"The trend of the numerical estimates given by the 202 participating economists is not greatly different from last year's survey," said Dr. George C. Smith, Dodge vice president and economist, "but there is a difference in the tone of the comments which the economists added to their questionnaires.

"There was a general feeling in last year's survey that 1957 would be an all-time record year. In the current survey, while the figures estimated would for the most part be at new record levels, the comments take little note of this fact.

"The apparent paradox between

(Continued on page 158)

See 5 Percent Increase in Dollar Outlay

... to $49.6 billion construction total

Outlays for new construction are expected to total $49.6 billion in 1958, 5 percent above the record expenditure of $47.2 billion evident for 1957, according to outlook estimates prepared jointly by the U.S. Depts. of Commerce and Labor.

This rate of dollar outlay would mark 1958 as the second highest year in the physical volume of work put in place (expenditures adjusted for price changes), exceeded only by 1955.

While $2.1 billion of this anticipated $2.4 billion expansion in 1958 will be mostly for both private and public residential building and highway work, expenditures for almost all other major types of construction will probably rise moderately or remain at about their 1957 levels. The only notable declines will be for private industrial plants and military facilities.

Total private expenditures for new construction are expected to contribute more to the total 1958 expansion than public — rising by $1.4 billion to $34.7 billion, compared with a $1 billion increase to $14.9 billion for public projects.

The expected volume of new construction this year is based on the assumption that any change in the economic pace — as measured by national output, income, and employment — will not be great enough to exert a significant push up or down on the total of new construction activity. It was assumed also that international developments would not affect construction within the U. S.

The estimates reflect expectations of an adequate supply of materials and labor, and the assumption that construction costs will continue to trend moderately upward, but at a somewhat slower pace than in 1957.

- A strong advance in total new residential building (private and public) anticipated for next year (8 percent, from $17.0 billion to $18.4 billion) represents a larger increase from 1957 in the number of apartments to be started than single family houses, continuing the decided uptrend in multifamily residential building which began early last year. It is likely that apartment units will constitute almost a fifth of total housing starts in 1958 — the largest proportion since 1949.

- Private nonresidential construction for the first time in six years will not show an increase. This is primarily due to an expected decline in industrial construction of about 9 percent. The value of contract awards for new plants began tapering off in mid-1957. This trend is expected to continue in 1958. However, spending in this sector will still be one-fifth greater than in 1955.

In general, expenditures for other nonresidential building groups, with the exception of office buildings, warehouses, and hospitals, will probably be maintained at or near the 1957 values.

In the case of office buildings and warehouses, the general high volume of business activity and the relatively low vacancies, especially in buildings with more desirable features and convenient locations, promise another year of expansion to bring annual outlays above the $2 billion mark for the first time.

Hospital construction will continue to show substantial growth in 1958, to almost the $600 million mark, despite the more than 50 percent increase last year. Federal aid funds have provided considerable stimulation in this area.

Outlays for stores, restaurants, and garages will stabilize at slightly above 1957 levels, following a sharp drop last year. Completion of many new large shopping centers started in previous years dominated activity in 1957, when a declining number of such projects was begun. There are, however, prospects that continued suburban growth and high retail sales will help maintain present annual outlays for this group.

Private school building, which also declined in 1957, will return to approximately the 1956 level.

The strongest single sector of nonresidential private construction in 1957 was public utilities. Prospects are that this year this group will show a 6 percent advance in spending—about half the 1957 rate of increase.

- Public educational outlays in 1958 are expected to reach the $3 billion mark, accounting for one-fifth of all public expenditures for new construction. This is more than three times the level in 1949, reflecting the relentless demand for more schoolrooms in the wake of substantial development of suburban areas, the large rise in the population of children of school age in the post-World War II period, and the low building rate of the 1930's and 40's.

The expected decline of 14 percent in expenditures for military facilities, to $1.1 billion, continues the decline begun last year.

Almost all of the expected $1 billion rise in public construction to $14.9 billion will come from state and locally owned projects, and 60 percent of it will be accounted for by new highways.

the generally increasing numerical estimates and the less optimistic tone of the comments seems to arise from the general feeling that the rise in the dollar indicators this year will be due largely, if not entirely, to inflation," explained Dr. Smith.

Practically all of the economists expected wage rates to rise in 1958. On the average, they expect the consumer price index to rise from its current level of about 121 to 123 by the end of the year. They predict gross national product to be running at the annual rate of $449 billion in the fourth quarter of 1958, as contrasted with the second quarter 1957 rate of $434 billion.

Executives See Active '58

DESPITE recent reports of sluggish economic activity in some lines, businessmen look forward to 1958 as a year of continued high business activity, both for their own companies and for the national economy, according to a poll of businessmen's expectations conducted by Dun's Review and Modern Industry.

Almost one-third of the total of 1627 executives interviewed expect narrowing profit margins to be their biggest problem. However, about 80 percent anticipate that 1958 profits will equal or exceed those of 1957.

Many hope to achieve an increase in profits through expansion. Of those reporting, 23 percent are most interested in adding to their facilities and their product lines, and 13 percent hope to concentrate primarily on improving sales methods through better merchandising and more extensive advertising. Only 1 percent have any idea of cutting production.

Those expecting a nationwide decline in net profits in 1958 are over twice as numerous as those looking forward to an increase.

Some 91 percent of all those interviewed think that their sales this year will equal or exceed those of 1957. Retailers and durable goods manufacturers were a little less hopeful on this than wholesalers and producers of nondurables, and a larger proportion of them expected sales to be their greatest problem in 1958.

Many expect higher prices to account for much of the rise in dollar sales. While 49 percent of those interviewed foresaw hikes in their own selling prices, 55 percent anticipated general price increases in the country as a whole.

Lull is to be Expected

"1958 WILL BE a good business year, but not a period of such peak prosperity as we have experienced. In a sense, there must be some tightening of the business belt." These thoughts are expressed by H. W. Heinrich, chairman, Uniform Boiler and Pressure Vessel Laws Society.

"In the recent past we have known little of austerity. But we cannot go on and on without at least an occasional setback or lull in advancement. Even if business is not maintained at the level of 1957, are we able to say that it isn't still good?

"When this tightening of the belt takes place it would normally first affect the so called luxury areas. Industrial heating and air conditioning are certainly not luxuries. They are now recognized as factors of importance, not just for comfort but for efficient business operation as well. They will not be sacrificed when their absence costs money. Proportionately, they may even be expanded.

"We look forward in 1958 to good although not spectacular business for the heating, piping, and air conditioning industry. Also, there will be more and better emphasis on the safe and efficient construction of its components," he stated.

See '58 Business Stable

"THE COMING YEAR'S overall business economy will be neither up nor down to any great degree," a leading manufacturer of heating and air conditioning equipment predicts.

"But, from 1959 onward the nation's economy will expand enough to support a gross national product of over $700 billion by 1966. This would mean a climb of about 60 percent over the total for last year."

Donald D. Couch, vice president, marketing and commercial development, American Radiator & Standard Sanitary Corp., speaking at the semiannual meeting of the Institute of Boiler and Radiator Manufacturers, continued:

"The year 1958 will be relatively stable. We're not going up because there is no one dynamic force, such as capital expenditures, autos, or construction. We're not going down because of the long range momentum of our economy and necessary expenditures for fighting the cold war. An expected small increase of 3 percent in the gross national product for 1958 to $447 billion would be the result of inflation, not an increase in physical volume."

The executive also saw costs and prices continuing to rise during the coming year and beyond. He, therefore, saw a special need for the heating industry in particular to increase productivity in order to improve earnings.

District Heating Moves Up

"THE DISTRICT HEATING business goes ahead at about 4 percent each year," reports John F. Collins, Jr., secretary-treasurer, National District Heating Association.

"This does not look like much, but 25 years from now, the volume of business will be doubled," he predicts.

This increase is predicated upon increase in service rendered by present utilities and not from new companies entering the field.

"One of the most prominent sources for increasing the district heating load is the use of steam for air conditioning. Also, the field of process steam is helping to increase the load.

"In other words, I believe 1958 will be another 1957, except that with the increasing population, business should increase somewhat," Mr. Collins says.

Tower Forecast Good

In the industrial water cooling tower picture, Raymond C. Kelly, executive manager, Cooling Tower Institute, expects to see further application of water conservation procedures by municipalities and private water companies and a resultant swing to the use of water conservation devices in general.

Local water regulations already encourage the use of cooling towers on major jobs and, he believes, 1958 will see the end of water waste in the air conditioning field.

A definite jump in the use of plastic materials will become apparent during 1958 in the industrial cooling tower field as well as in the smaller factory assembled units. Likewise, a general acceptance of asbestos-cement board for exterior surfaces is probable, he says.

After a disappointing total volume in 1957, reflecting a reduction in capital expenditure and construction of major process plants, Mr. Kelly expects this year to see the pendulum swing back to a volume more nearly like 1956.

He foresees that the full effect of the swing may not occur until the first half of 1959, but that its generally beneficial effect will show during the last half of 1958.

'57 Growth Key to Future

Air conditioning became more firmly entrenched as an integral part of American life during 1957, and the industry producing it looks forward to a new year of even greater public awareness of its contributions to health, comfort, industrial development, and the national defense, reports George S. Jones, Jr., managing director, Air-Conditioning and Refrigeration Institute.

While room air conditioner sales took a breather last year, installations in commercial and industrial structures continued their climb, based upon the reports from most of the major manufacturers of such equipment.

Complete figures are not yet available, but it is estimated that the 1957 figure for installed cost of large systems ran well ahead of the 1956 total of $557 million, which was $120 million more than the 1955 figure.

Increased interest in the manufacture of heat pumps during 1957 is expected to become a larger factor in the production of many companies in 1958 and ensuing years.

Gas fired air conditioning made gains, leading some authorities to predict that it will become an increasing factor in the industry in coming years, thus opening up new fields.

Using 1957 developments as criteria for predicting 1958, Mr. Jones said that the future of the industry seems even rosier than at the end of 1956. At that time it was able to report sales increases, but not so much in the way of developments pointing to an expanding future.

"Within the next decade the non-air conditioned structure will become obsolete, and workers in virtually all fields will do their daily stints in air conditioned surroundings and will travel to and from work in air conditioned vehicles.

"Our industry has had an outstanding decade since World War II. The next 10 years will see even greater growth and impact on our lives and economy," he concluded.

Coal Production Steady

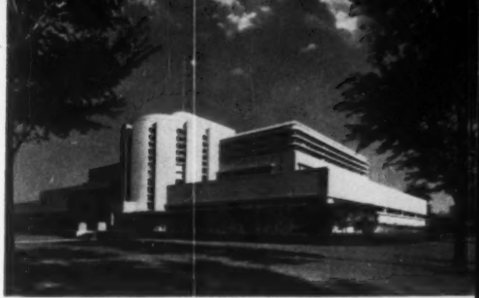
1958 bituminous coal production will come within 3 or 4 percent of the 1956 and 1957 production, predicts Carroll F. Hardy, managing director, Bituminous Coal Institute.

"While this will have little direct effect on the heating and air conditioning market, any downturn in business will undoubtedly postpone modernization of heating and the installation of air conditioning," he stated.

Copper Encouraging

The outlook for the sale of copper and brass mill products in the heating, piping, and air conditioning field during 1958 is encouraging, according to Robert C. Carmody, Copper & Brass Research Association.

The predicted increase in building for 1958 should mean the installation of more radiant heating systems, heat pumps, and air conditioning units. All these utilize significant quantities of copper tube, as do solar heating systems.



It is felt, therefore, that copper and its alloys will be in greater demand during 1958.

Busy Year for Solar Energy

The Association for Applied Solar Energy forecasts that 1958 will be a busy year in the field of solar energy.

John I. Yellott, executive director, foresees a rapid increase in interest in solar space heating. He attributes this to the completion of such structures as the Bridgers and Paxton building in Albuquerque, the Lof House in Denver, and the association's own solar house and laboratory at the University of Arizona.

Mr. Yellott predicts that real attention will be given this year to the problem of using solar energy for air conditioning. He feels that a feasible solar air conditioning system would help to spread the use of solar energy heating systems, by making the combination more economical.

Gas Looks Bright

"The gas utility industry is expected to continue increasing its service in 1958," reports C. S. Stackpole, managing director, American Gas Association.

An increase of 8 percent is anticipated within the next two years. Nearly 1 million additional new customers will be served during each of the next nine years. This will raise the total to about 38¼ million customers by 1965.

Gas for air conditioning is being used more widely than before. This is leveling the load requirement for gas throughout the year, says Mr. Stackpole.

(*Continued on page 346*)

What to consider when . . .

Designing, Fabricating

The authors review current pressure equipment practices and analyze the interrelation of materials, design, fabrication, and inspection with safety, economics, and service. These considerations lead to a proposal for a new broad "balanced" approach.

BY J. J. MURPHY*, C. R. SODERBERG, JR.**, H. S. BLUMBERG***, and D. B. ROSSHEIM****

THE DESIGN and fabrication of pressure equipment poses a constant challenge to industry if it is to keep pace with today's ever widening scientific developments. Pressure piping, as a field of such equipment, has benefited from and progressed along with the pressure vessels and boilers with which it is assembled. Piping now faces evolution to a more comprehensive basis for economic and safe application to less ductile or expensive materials, and complex assemblies or critical services. This long needed refinement has resulted from the needs of pressure equipment for nuclear power installations.

This article will examine current practices and the engineering approach as to economics, suitability, and reliability. It will outline a proposal for a new broad "balanced" approach to more effectively meet current needs for all services.

Present Codes Limited

The coding of safety requirements for pressure equipment was started almost 50 years ago. First efforts were devoted to boilers. Later, keeping pace with rapid industrial expansion, coverage was extended to pressure vessels. About 20 years ago, with the increasing significance of pressure piping, a tentative code was issued.

This initial and succeeding editions of the American Standard Code for Pressure Piping (ASA-B31) were limited to attempted solidification of opinion as to minimum requirements for broad industrial applications and, as such, constituted only a suggested practice.

The recent release of Section 8—Gas Transmission and Distribution Piping Systems has led to the establishing, by the piping code committee, of a conference committee composed of pressure equipment enforcement heads in the U.S. and Canada. Thus, the piping code more and more assumes the status of an "enforcement code."

This would seem to bring to an end the once widely held opinion that piping, due to the lesser structural demands of its smaller diameter and girth welds, only offered insignificant hazards.

Require Initially Safe Construction

The objective of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code rules is to establish minimum requirements for *initially safe* construction. While it is intended that application and operating considerations be the responsibility of the user and enforcement authority, separate and specific service code sections — for instance, power, heating, and miniature boilers—do reflect service requirements. Also, earlier issues classified levels of pressure vessel quality as to service, pressure, and temperature (U-68, U-69, U-70, U-200, and U-201).

More recent editions omit this classification, but continue mandatory radiographic examination and stress relief for lethal contents and place a thickness and temperature limitation on structural quality plate, irrespective of service.

Other code provisions establish only minimum fabrication and/or design without regard for service. Secondary stresses are not evaluated. Accordingly, no criteria are provided for overloads, repetitive applications of pressure and/or temperature, or for thermal or other strain effects. Design details, such as heads, nozzles, and flanges, are established by approximate formulas, and the least favorable detail can be applied to the most rigorous service. Reliance for strength evaluation of special details on proof yield or burst tests, insensitive to local stress, further emphasizes this general deficiency.

The piping code is presently organized in the following service sections: power piping, industrial gas and air piping, oil refinery piping, oil transmission piping, refrigeration piping, chemical industry process piping, and gas transmission and distribution piping. It follows essentially the same objectives as the boiler and pressure vessel code—"minimum requirements for new construction"—although service section subdivisions provide a limited degree of specific service requirements.

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This article is adapted from a paper presented at the American Society of Mechanical Engineers Petroleum Mechanical Engineering Conference, Tulsa, Okla., September 22-25, 1957.

Pressure Piping

PRESSURE PIPING fabrication requires considerable care in welding. For a summary of requirements of four classes of welding, see Table 1 on page 163

The piping code has attained an advanced status, since its rules for expansion and flexibility recognize local stress and useful life as related to cycles of temperature.

On the whole, however, piping code requirements have not yet attained adequate stature, even as minimum for average service. Fabrication requirements are not yet meaningful. Inspection and over pressure protection requirements are generally lacking.

Striking an Economic Balance

Complete safety for pressure equipment is an idealized goal. Its attainment would be possible only with complete fundamental and applied knowledge of materials, design, fabrication, and inspection. Blind reliance on conservatism or generous safety factors is as unreliable with respect to safety as it obviously is economically.

The philosophy of "maximum economic safety" is to strike a balance between reduction in losses due to pressure equipment failures as weighed against the cost of improved pressure equipment quality. The balance should favor safety, with no step omitted whose cost does not far outweigh its potential contribution toward failure reduction. This end is achieved only by a thorough association of pressure equipment quality with individual service demands.

Pressure equipment capabilities are measured by the combined influence of the aforementioned design, materials, quality of fabrication, and the degree of inspection and testing. None of these factors should be neglected. Each level of quality must represent a like measure of refinement if most favorable economics for pressure equipment is to be achieved. This may be termed "optimum balanced pressure equipment."

Pressure equipment services vary widely as to their structural demands, and to the dangers of released contents as well as in their potential damage to surroundings. Complex configuration, or details which may impair capability for developing full potential strength, must be given special design and fabrication consideration. Likewise, materials which are less ductile, severely air or work hardening, subject to embrittlement, or otherwise sensitive involve special precautions.

Both seamless and welded schedule sizes of pipe (24 in. maximum) and pipe fittings are being produced in many ways, with concentricity, roundness, diameter, and thickness tolerances dictated by the method of production and pipe size. As a result, end preparation limited to scarfing mill pipe involves mismatch in inside diameter and variation of weld lip thickness, which is at a maximum when the end preparation is concentric to the outside diameter.

Except for fusion welded pipe (ASTM-A-155), nondestructive examination is not widely used. The mills rest on an attitude that the customer must prove the presence of harmful defects for replacement. Surface defects are assumed to be harmless unless they are shown to encroach on the minimum wall thickness.

Automatic and continuous nondestructive examination offers opportunity for quickly and economically determining quality, particularly of welded pipe. There is a vital need for defined grades of piping as established by nondestructive examination and other recognized quality control commensurate with service severity. This should not be left to individual agreement on the basis of a selection of brief, nonmandatory specifications.

Piping design for pressure service involves such factors as relatively large branch connections, heavy wall thickness, and particular shapes. Pipe bends, mitre bends, ells, tees, crosses, and valve bodies are common. In combination with branch connections and flanges, these shapes often provide a piping system far different from the "simple surface of revolution" description.

The structural loading aspect of piping is frequently an important factor. It often necessitates that the complex irregular frame of a piping system float on yielding supports to take care of weight and vibrational effects, and at the same time retain full flexibility to withstand thermal expansion without distress to the line or damage to attached equipment. Structural loadings unless carefully assessed can make piping more susceptible to fatigue failure, particularly the extreme concentrated loads at attachments where local stresses may be critically augmented by thermal gradient effects.

Cite Requirements for Adequate Piping Design

In general, adequate piping design must satisfy three requirements:

1) Sufficient strength to avoid excessive general or local yielding

2) Maximum stress range (general or local) compatible with the required cycles of combined mechanical and thermal loading

3) At elevated temperature, the stress maintained by external loading must be consistent with acceptable creep rate and creep rupture life.

Depending upon service requirements and design details, analysis may be required:

1) For stress distribution under a fully elastic state

2) For stress distribution under an elastic-plastic or plastic state

3) For integration of repetitive strains resulting from 1 and 2, above, to determine fatigue life

4) For stress distribution under creep.

Determining Weld Quality

Piping fabrication (girth and branch welds) requires techniques capable of producing acceptable weld quality so as to attain a root weld and surface for a selected pipe end preparation consistent with specified deposit quality. With the diameter, roundness, and weld lip thickness variation commonly encountered on scarfed mill end pipe, uniform penetration and favorable inside weld surface cannot be consistently obtained.

Commercial backing rings permit wider root gaps and thus facilitate penetration to the inside of the pipe. However, backing rings should not be considered as a substitute for skill of the pipe welder, since their use may cause slag entrapment and unfusion. These backing rings are used where an average improvement in weld quality is a reasonable expectation; i.e., only on lighter wall thickness of standard weight pipe, where the average match of inside diameter is better, and open clearance between backing rings and pipe is minimized.

The basic essential for uniform high quality pipe butt welds is close tolerance welding lips, obtained ideally by close tolerance machining or when a uniform ID results by sizing which may be combined with drive fit tapered backing rings. Backing rings may cause either ID restriction or reduction in wall thickness unless upset ends are used. Further, their presence may originate and mask root cracks, and does not prevent root-oxide inclusions. They are, therefore, limited to small ID pipe and/or applications of moderate or low fatigue potential.

Consistent full penetration of the weld without backing rings starts with the already mentioned accurate end preparation for uniform welding conditions, and equally important close control of heat input and metal deposition and/or fusion.

In recent years a number of special techniques have evolved which are capable of consistently uniform results by operators of average ability. With the wide application of inert-gas welding to root passes, the opportunity is readily afforded for introducing the gas into the pipe, thus eliminating inclusions and surface oxidation of the weld root.

A more highly developed technique for precisely regulated backing gas pressure as related to welding position permits selective control of the root bead ID contour and of its surface to eliminate all roughness, protrusion, and undercutting. Thus, pipe butt welds are now available which truly match the quality heretofore obtainable only where access to the ID was possible to permit a double welded butt joint.

Pipe bends and ells are commonly made from tubing. Their fabrication involves considerable deformation in shaping. This justifies careful surface examination for critical service.

Due to the awkward geometry of main piping systems, a number of shop butt welds cannot be rotated for welding, and with the general elimination of flanges, final erection welds with full restraint cannot be avoided. Local thermal treatment of welds is often necessitated by the dimensions of an assembly.

Examination Techniques Undeveloped

The nondestructive examination of schedule size piping is handicapped as a result of inside access being limited to short end portions or through branch connections or other openings, and by the sharp curvature of its relatively small diameter. Techniques specifically suited to the effective radiographic examination of piping are as yet in an initial stage of development. Pioneering efforts are limited at present to American Petroleum Institute Standard No. 1104 and the recently issued tentative procedure of the British Standards Institution.

Many aspects of radiographic examination as applied to piping require exploration. For example, with the radiation source outside of the pipe, there is no established agreement as to the effect of penetrameter location, or as to the number of exposures necessary to cover the circumference for interpretable results.

As a result, radiographic examination of piping often serves as a general check on procedure and the ability of the welder, not as a searching quality control for the positive elimination of defects, particularly cracks.

This limitation has led to the increased use of ultrasonic examination and of magnetic powder, dye penetrant, and similar examination aids. However, their contribution toward defining quality is restricted, due to the lack of code or industry established standards.

Inability to radiographically assess the root condition of welds has led to various means for viewing the inside surface of pipe welds. Periscopes or mirrors are inserted from the end where the pipe is not too lengthy nor curved. Through small root openings the ID can be

(Continued on page 164)

TABLE 1—DETAILED REQUIREMENTS of four classes of pipe welding summarized

Classes of quality --- single welded circumferential butt welds

Detailed requirements / Class			I		II		III		IV	
			IA	IB	IIA	IIB	IIIA	IIIB	IVA	IVB
Brief Description of Basic Differences			Static and fatigue strength equal to unwelded pipe		Static but not fatigue strength equal to unwelded pipe		Average static strength equal to unwelded pipe, fatigue strength appreciably below unwelded pipe			
			O. D. surface fully smooth		O. D. surface reasonably smooth		O. D. surface as welded			
			No backing ring		No backing ring	Drive fit backing ring	No backing ring	Drive fit backing ring	No backing ring	Snap fit backing ring
			I. D. machined or sized		Mill end pipe	I. D. machined	Mill end pipe	I. D. machined	Mill end pipe	
			I. D. surface smooth	I. D. surface slightly irregular	I. D. surface as welded, root offset permitted		I. D. surface as welded, root defects present			
			Fully examined by all practicable methods		Fully examined by radiographing and intrascope		Spot examination by radiographing and intrascope		Outside visual examination only	
Permissible process for root pass			Inert gas metal arc with inert gas shield on I. D.		Acceptable process capable of achieving required quality					
Joint details and end preparation	Backing Ring	Machined drive fit	Not permitted unless of consumable type		Not used	Acceptable except for austenic steels	Not used	Acceptable	Not used	Acceptable
		Commercial snap fit				Not permitted		Not permitted		Acceptable
	End preparation	Inside Diameter	Machined to close tolerance (Note 1.)		As supplied locally. Ground for fit-up if necessary	Machined on taper for backing ring	As supplied	Machined for backing ring	As supplied by mill	
		Weld-lip thickness	1/32 in. with close tolerance		1/16 in. nominal		1/16 in. nominal		1/16 in. nominal	
		Weld groove	Machine tool cut		Machine tool or machine flame cut				Tool or flame cut	
		Weld groove contour	"U" bevel		To 3/4 in. - 30 to 37½ deg V bevel. Over 3/4 in. U bevel		Same as class II		30 to 37½ deg V bevel	
Fit-up	I. D.		Subject to close tolerance		1/16 in. max. offset	Drive fit	Mill pipe tolerance	Drive fit	Mill pipe tolerance	
	Root gap				± 1/32 in.		± 1/32 in.		± 1/16 in.	
Weld surface	O. D.	Overlay and finish	Smooth inert gas deposit or arc deposit, ground smooth 1/16 in. max. reinf., no undercuts, scratches or shoulders		Per ASME Code Sect. VIII, Par. UW 51 except undercutting per ASA B31.1 Par. 630 permitted		Finish per ASA B31.1 Code Par. 630 (a) (6)		Finish per ASA B31.1 Code Par. 630 (a)(6) except 3/64 in. undercutting permitted	
	I. D.	Oxidation	No oxide inclusions		——	——	——	——	——	——
		Protrusion	1/16 in. max.	1/16 in. av 1/8 in. max.	1/8 in. av	——	Per ASA B31.8 Code Par. 829 (Note 2)	——	As results from acceptable procedure and tolerances	——
		Smoothness	Substantially smooth and blending smoothly into pipe wall. No undercutting	Same as IA except occasional minor ripples acceptable	As results from approved procedure and fit-up tolerances	——		——		——
	Penetration		Complete		Complete to the I. D. of the pipe having the greater I. D. of the two pieces being joined		Nominally same as Class II except for limited lack of penetration (ASA B31.8 Par. 829)		Procedure and objective same as Class III	
Non-destructive examination	Visual		Required at fit-up during welding and outside surface of each weld		Required for fit-up and root pass of each weld and for outside surface of each weld		Required for outside surface of each weld, spot checking of fit-up and welding required		Required for outside surface of each weld	
	Intrascope (or equal) examination of root		Required for each weld		Required for each weld	Not applicable	Spot check 1 weld in 20 of each welder	Not applicable	Not required	
	Radiographic	Extent	Complete		Complete		2% of lin. ft of welding (50 ft units)		Not Required	
		Sequence	After post heat treatment		After post heat treatment for air hardening and austenitic steels		——	——		
		Interpretation	ASME Code Sect. VIII, Par. UW-51		ASME Code Sect. VIII Par. UW-51 except O. D. surface undercutting acceptable and root penetration and protrusion to be judged by intrascope	ASME Code Sect. VIII Par. UW-51 except O. D. surface undercutting acceptable	ASA Code B31.8 Par. 829 except O. D. surface undercutting per ASA Code B31.1 Par. 630 (a)(6) root defects to be judged by intrascope (See Note 2)			
	Retest if spot examination not satisfactory		——		——		Examine root of 2 more welds and 4 percent additional lineal ft of welding; if unsatisfactory, rest of 50 ft unit must be examined		——	
	Ultrasonic		Required		Desirable		Not required		Not required	
	Magnetic particle		Required for magnetic materials		Required for ferritic materials over 2 percent Cr		Not required		Not required	
	Penetrant Oil		Required for non-magnetic materials		Required for austenitic materials		Not required		Not required	

Footnotes: (1) I. D. machining to provide ½ in. min. rad. and 1:4 min. taper at runout and 40 micro-inch finish.
(2) B31.8 Code Par. 829 permissible defect lengths are suitable for large pipe but require adjustment for application to small diameter pipe.

viewed by eye or through a miniature telescope with illumination by an extension light inserted from the end of the assembly or by the use of a miniature self illuminated flexible periscope (intrascope) of the type used by physicians. A more recent development is a small television camera for insertion in the end of the pipe.

Inspection of the weld root as completed offers the added advantage of more economic repair of root defects and better weld quality as compared with root repairs accomplished from the OD on completed welds.

Factors Influencing Quality of Weld Deposits

The quality of deposits from fusion welding, whether machine or manual, is influenced by many factors, namely:

1) Parent metal; weldability, cleanliness, and freedom from harmful contaminants
2) Electrode analysis; cleanliness, compatibility with parent metal, and freedom from harmful contaminants
3) Electrode coating; analysis and condition (continuity and moisture content)
4) Equipment adequacy; condition and settings
5) Operator comfort; protection from weather, adequate access for avoidance of muscular strain
6) Power supply; uniformity
7) Shield gas supply; uniformity in quantity and analysis
8) Welding position
9) Joint preparation; contour, dimensions, tolerances, and cleanliness of surface
10) Fit-up; selected root gap, variation of same, weld lip offset and angularity
11) Completed weld surface; smoothness, undercutting, weld edge shoulder, ripples, and bead intersections
12) Degree of restraint to longitudinal and radial contraction of the weld deposit
13) Preheat, intermediate heating, and postheat
14) Supervision; adequacy and extent
15) Quality control; extent and competency of visual, nondestructive and destructive examination
16) Repair technique
17) Operator skill
18) Weld procedure.

Schedule size pipe — with its dimensional variation and limitation of access from the OD only — and piping systems — with their complex geometry and frequent necessity for position welding — emphasize certain factors. These are:

1) Fit-up which, in the absence of machining or machine sizing, must consider:
    a) Variations in ID and concentricity
    b) Variation in lip thickness.
2) Weld procedure which, consistent with the quality specified, must provide:
    a) Technique to secure penetration and avoid excessive protrusion or burn-through
    b) Back shielding if oxidation of root pass is to be avoided
    c) Weld groove contour and root gap compatible with dimensional variation of pipe
    d) Adequate nondestructive examination with due consideration to restriction on source location, extreme curvature, access from one side, uneven thickness and ID of pipe, and nonuniform root weld
    e) Techniques suitable for various positions and degrees of restraint.

"One Quality Welding"

In the absence of meaningful code requirements since World War II, there has flourished a myth of so-called "one quality welding," universally applicable and obtainable through emphasis on initial quality control alone — without the preparation, continuous quality control, and special techniques on which weld quality depends. The inevitable result is average quality, inadequate for critical service, but exceeding that required for nonhazardous mild service. In other words, it is a basic lack of appreciation of "maximum economic safety."

Classify 4 Degrees of Quality

Pipe butt welding is presently attainable in four basic degrees of quality, with innumerable intermediate variations. Each degree is properly related to a balanced integration of joint preparation, fit-up, penetration, weld surface and soundness, quality control, thermal treatment, etc., as associated with the material analysis involved.

Classes I and II, which are fully and extensively examined, must provide maximum assurance that no more than the defects prescribed as permissible for the class are actually present. Classes III and IV, involving less extensive quality control, need only assure that the construction meets the quality objective on an average basis, and not that every weld meets the prescribed quality as a minimum. These four qualities are designated as follows:

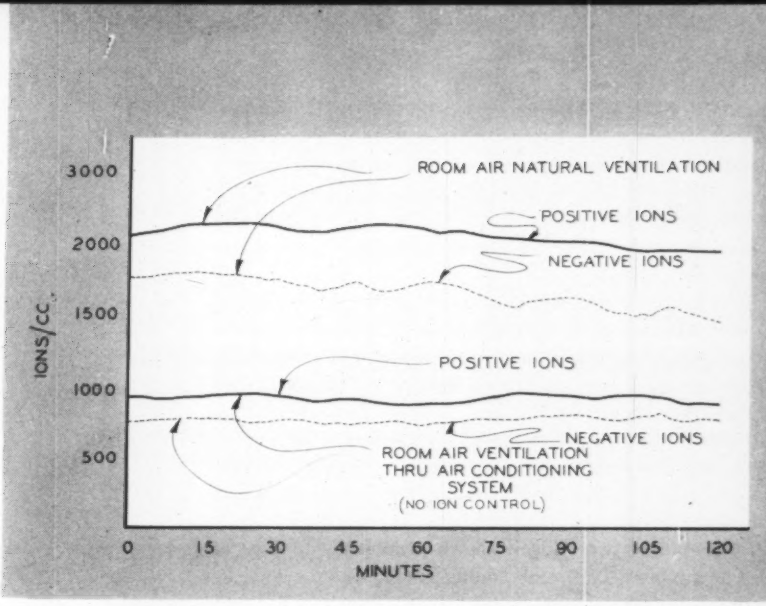
Class	Description	
IA	ID machined pipe ends, full examination	prescribed qualities
IIA	Mill pipe ends, full examination	
IIIA	Mill pipe ends, random examination	assured average qualities
IVA	Mill pipe ends, visual examination	

Detailed requirements of these four classes of welding are summarized in Table 1 for convenient comparison. To more completely cover present practice, an alternate is included for each class which reflects a somewhat lower quality and/or the use of backing rings. These are:

Class	Description	
IB	Same as IA, except ID weld surface contour not fully controlled	prescribed qualities assured
IIB	Same as IIA, except either ID machined for drive fit backing ring	
IIIB	Same as IIIA, except either ID machined for drive fit backing ring	average qualities
IVB	Same as IVA, except with snap-in backing ring	

‡

In another article to be published in an early issue, the authors will extend the four classes of pipe butt welding quality into four construction classifications.



1 EFFECT of air processing on natural small ion density of room air is charted here. Note that density in ordinary air conditioned room is about half that of outdoor air

Ions' Role in Air Conditioning Takes on New Importance

With physiological evidence that the electrical characteristics of air affect the human respiratory system, methods of controlling atmospheric ions in air conditioning take on practical importance. Now, ions can be absorbed or generated as necessary. Measurement has been reduced to simple procedure using portable equipment.

BY JOHN C. BECKETT
Chief Engineer
Wesix Electric Heater Co.

As WE ALL KNOW, the term "air conditioning" encompasses all processes for treating air so as to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the requirements of the conditioned space. The electrical characteristics, or ions, of air may also be included as part of this definition. This is especially true now that simple means are available for their measurement and generation.

Remarkable advances in electrical techniques in medicine and biology in the last few years have firmly established that air ions influence the human respiratory system and are, therefore, important in air conditioning. While there is still much research to be done in the biological and medical fields, the knowledge to date is conclusive enough to warrant the consideration of electrical space charge created in air conditioned spaces and the possibility of excessive ion generation or absorption.

Atmospheric ions may be divided into three groups: (1) small ions are molecular complexes of about a dozen gas molecules associated with a single electrical charge; (2) intermediate ions are very small charged particles submicroscopic in size but consisting of about 100 molecules; (3) large ions are charged particles extending partially into the visible range and are 1000 times or more larger than small ions.

Large ions are not particularly significant biologically since these charged particles are easily collected and removed from the air and are not present in any large quantity in processed air.

It is the small and intermediate ions heretofore difficult to detect and measure that are of importance in air conditioning. In outdoor air few intermediate ions have been detected. However, in our urban centers, as a direct result of air pollution, intermediate ions can be the dominant influence in the absence of small ions unless adequate precautions are taken.

Where Do Ions Come From?

Ions occur naturally in nature, generated primarily from minute radioactive material in the soil and the substance around it. Cosmic rays are also an important source of ions in the lower atmosphere. In processing air there are ion sources that greatly alter the natural condition. These include electrostatic air cleaners, ultraviolet lamps, fluorescent lights, heating elements reaching incandescence, and selective absorption of ions by various materials.

The most common situation in an air conditioned space is an inadequate supply of negative ions, particularly small ions. Small ions have a relatively short life, lasting only minutes, depending on the relative humidity and air contamination. In heating, cooling, and filtering of air, small ions contact the metal components of the equipment and are thereby lost. The small ion density indoors in an ordinary air conditioned room can be expected to have approximately half the value of small ions present in the outdoor air. This is shown graphically in Fig. 1.

The problem is one of adding small negative ions in order to bring the balance back to normal. The absence of negative ions is more common and of greater importance than lack of positive ions. Since the distribution of unipolar ions can be accomplished much more easily than the distribution of bipolar ions, negative ion generation affords the most practical solution to bringing the natural environment into the most desirable condition.

Occasionally, indoor air will be charged abnormally high in positive ions, particularly where incandescent metals are used for the heat source or in the use of air cleaning equipment with inefficient collection of charged particles. A positive space charge under these conditions may reach a level four or five times normal. This depresses the negative ion density to a very low level and creates a condition that may irritate the nose and throat.

Elimination of excessive positive ions at the source, using charged collecting grids or similar means, is the first step in the control of a positive ion space charge. Where this is impractical, negative ion generation in sufficient capacity to reduce the positive ion space charge through combination of ions affords another solution.

For combination of ions to be most effective the negative ion source should be placed as close to the source of positive ions as conditions will permit. Merely introducing negative ions into a room without regard to the forces affecting the combination of ions may prove insufficient.

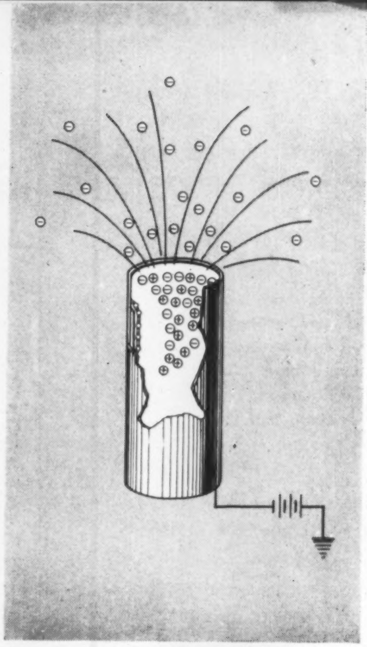
Generate Negative Ions

Artificial ions can be generated in the following ways:

1) Radioactive sources — nature's method
2) High voltage corona discharge
3) Incandescent metals

Of these, a portable type negative ion generator has been found to be convenient and controllable. A schematic of this type of unit is shown in Fig. 2, and its performance in Fig. 3.

This device employs radioactive tritium, which is contained in a titanium foil and mounted on an electrode encased in a suitable plastic guard. A potential impressed on the electrode separates the ions as desired. The desired unipolar ion is electrostatically directed away from the electrode by placing a charge on the electrode of the same polarity as the desired ion. This simple device can re-establish the normal negative ion density in an average sized room.



2 NEGATIVE ION GENERATOR is most convenient, controllable means to increase ion concentration of room air. Schematic drawing above illustrates how ions are dispersed

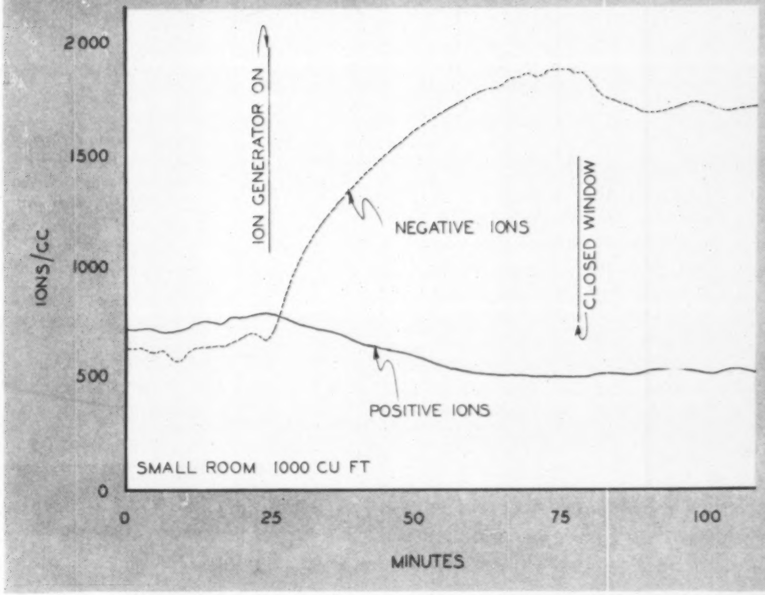
The radioactive element has an ion generating capacity of 10^{-8} amperes and can ionize an airflow rate up to about 300 cfm.

The radioactive tritium element can also be placed in combination with air conditioning equipment. Forced air circulation gives greater distribution of the ions and under some conditions this is an advantage. The element may be mounted directly onto the air supply outlet, where air is discharged into the room. Small ions would otherwise be absorbed within the equipment.

Place Element at Each Outlet

In central air conditioning systems the rectifier supply for the electrode of the ion generator can be installed inside the unit. The ion generating element may be placed at each supply outlet. The radioactive element is 2 in. in diameter and projects approximately 1 in. This is mounted on a plastic base enclosing the terminal connection for charging the electrode. The base can be any reasonable shape for simple mounting on the supply outlet frame. Wiring will depend on local code requirements. A single rectifier supply may be used for connection to several elements.

The electrical connection between the supply can be run in conduit, or, where codes permit, in the ventilation duct itself. This wire must be suitably insulated for the voltage involved and the moisture and temperature condi-



3 EFFECT of portable negative ionizer in average sized room shown here. Note increase in negative ions, sag in positive ions when unit is operating

tions that might prevail in the duct. The recommended potential on the electrode is 900 volts, with the current limited to 5 milliamps. This current limitation places the circuit outside the power circuit requirements of the National Electrical Code and into the rules affecting communication and control circuits. It is only necessary to run a single wire to each element, as the positive terminal of the rectifier should be well grounded.

Turning off the forced air circulation will not turn off the distribution of negative ions, though it will reduce the density. Thus, one can have more or less continuous negative ion generation independent of the rest of the system.

To date there has been no observed condition of excessive negative ions in an air conditioned space. Negative ion space charges apparently do not occur in uncontrolled conditions and natural saturation of negative ions seems to automatically limit the level of negative ion density that can be achieved. This makes control of negative ion generation quite simple and the equipment can be energized continuously without concern for regulation. The current supplied to the rectifier for ion separation is insignificant and the radioactive tritium decays very slowly, whether or not the equipment is energized.

How is Ion Density Measured?

One of the first questions that arises in applying air ionization to air conditioning is that of measurement. How do we know whether we need to add negative ions, take away positive ions, or what? In other words, what is our system doing now and what does it need to do to provide the most favorable condition?

One accurate means available for measuring atmospheric electricity employs a simple collector system. Air is passed through a tube and the ion polarity to be measured is collected on a well insulated surface of sufficient area to give an ion current that can be amplified with standard laboratory equipment. This device in combination with a micro-microammeter gives a direct reading of the ion density and can be calibrated in terms of ions per cc. The equipment has a sensitivity as low as 20 ions per cc and is fully capable of measuring normal small ion density in the range of 300 to 1000 ions per cc.

For detection of ion sources and for checking ion generators to see that they are working properly, a more compact device may be employed. This is a target collector. It consists of a collecting disk the size of a small coin shielded with a wire guard firmly attached to the shielding of the flexible cable connecting the target and the amplifying instrument.

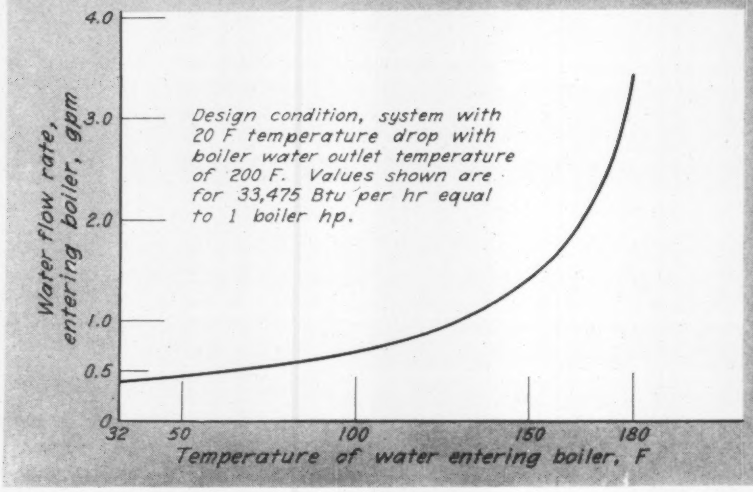
This equipment is not suitable for measuring the normal ion density, but it is convenient for detecting ion sources; that is, excessive ion generation from electrostatic filters, ultraviolet lights, and incandescent metals. The equipment can be used in much the same manner as velometers and other devices.

With the calibrated collector and the target collector, ion measurement is reduced to simple procedure and understanding. Under some circumstances it is desirable to distinguish the size of the ions by measuring the ion mobilities, and this can be done using the calibrated ion collector.

More Work to be Done

While there is still work to be done in the field of ion generation, progress to date has made possible its practical application in air conditioning. Although comparatively little importance has been placed on ionization in the past, its place alongside the other elements of air conditioning is gaining increasing stature. ‡

1 SUGGESTED FLOW-TEMPERATURE relationship as means to combat thermal shock to hot water boilers is charted here. The ideal design water flow rate through a 100 hp hot water boiler would be about 344 gpm. The same boiler used as a steam boiler would require an ideal feedwater flow rate of approximately 6.9 gpm, with feedwater at 180 F and evaporation at 212 F



Thermal Shock to Hot Water Boilers:

Its Causes, Cures

An important consideration in hot water heating is the prevention of thermal shock to boilers. Some of the contributing factors and possible solutions to this problem are discussed here.

BY BERT STREETER
Young-Streeter Co.

THE PROBLEM of thermal shock in hot water boilers has become apparent in recent years, due to the use of higher temperatures and circulation rates, and the rapid heat transfer characteristics of modern and efficient types of connected heating systems. Its ill effects are usually manifested by loosened boiler tubes or fractured ligaments.

Many of the failures resulting from thermal shock have not been analyzed properly and such failures have been incorrectly identified as defective materials or improper installation. Actually, thermal shock is incurred by rapid, uneven cooling of a boiler or its parts caused by the introduction of relatively cold water into a relatively hot boiler at an excessive flow rate.

The majority of hot water heating systems are designed for a temperature drop of 20 F with boiler outlet water maintained at 200 F. Thus, water is circulated and returned to the boiler at no less than 180 F, even on the design day and at the theoretically perfect water flow rate. Compare this normal operation to the situation occurring when boiler water is at 200 F, the connected system is at 60 F, and circulating pump or pumps are suddenly put into operation. The ratio of temperature difference to the design condition becomes 7 to 1 (200 F − 180 F = 20 F; 200 F − 60 F = 140 F; 140 F/20 F = 7).

This condition can occur as a result of: (1) human error (for example, firing the boiler to temperature before putting the pumping equipment into operation), (2) electrical power failure (a connected heating system cools many times faster than a well insulated boiler, and shock occurs upon restoration of power), or (3) control system design (day-night systems result in a shock condition at each requirement to increase building temperature, and the severity of the shock for any given system will vary in relation to outdoor temperature). Other conditions can cause thermal shock, but the three described are the most common contributors.

Actual conditions encountered are much more severe than those indicated by the 7 to 1 cooling-heating ratio. This severity is caused by conservative pump sizing, the standby pump being operated simultaneously (as in the case of a central pumping station), and the fact that return water is concentrated in a smaller area than the combustion gases when heating the boiler water. The comparison is made in this manner because it is poor practice to apply "high fire" suddenly to most cold boilers, especially a large boiler, even though many well designed boiler units can withstand this type of treatment without immediately noticeable damage.

In general, boilers with relatively short tubes and internal baffling would be more shock resistant than units otherwise constructed. This would indicate also that small boilers of any given construction are more shock resistant than larger units of the same design, and that shock resistance will differ in all designs.

Consider Methods of Solution

The term "permissible thermal shock," though negative in nature, may be applied as a measuring guide. The physical units applied could be degrees drop per second (or minute) of boiler inlet water temperature, as related to controlled outlet temperature. While this might provide a workable index, it would be too impractical to establish this value conclusively since it would be necessary to run expensive destructive tests on each size and design of boiler.

It is more practical that the required features or elements be incorporated to assure that the unit can withstand at least the same amount of cooling that the same unit can absorb heat for maximum capacity.

Most available boilers are capable of this. Their only requirement for the prevention of thermal shock damage is the use of a properly designed system or protection device to eliminate the shock condition. Any particular system can be provided with such protection by the application of standard control items available. However, no standard product as a unit is known which can be economically applied as a type to all sizes and arrangements of hot water heating systems.

Various possible solutions for protection against thermal shock are as follows:

1) A temperature actuated shutoff valve in the piping
2) An additional pilot temperature element to sense dangerously low return water temperature and override normal control elements to position the main tempering valve
3) An additional circulating pump operating on a closed loop with the boiler
4) A temperature actuated electrical relay to deenergize the pump motor or motors
5) Tempering the return water
6) Provision for more even distribution of return water to the internal portions of boiler, by increased baffling and manifolding.

Cite "Ideal" Protection Device

The aforementioned solutions as well as others are deficient as compared to the "ideal" device for protection against thermal shock. Such a device would:

1) Regulate the flow rate in accordance with the requirements set forth by the boiler manufacturer. (A suggested safe flow-temperature relationship is shown graphically in Fig. 1)
2) Fail safe (flow restrictor to close) on failure of the force element used to permit high flow rates
3) Be dependable to the extent that operation is assured after long periods of inoperation
4) Have fast response to temperature changes. This is calculated to require 10 to 15 sec for full stroking of restrictor on average system as installed
5) Be self operating (heat operated), not dependent upon external source of energy
6) Be easily adjustable by normally qualified boiler service personnel
7) Provide for maximum load pickup during and immediately after the requirement for protection
8) Be capable of providing protection, regardless of the number of pumps which could be in operation on the connected system
9) Have low restriction to flow during normal operating periods. It is suggested that the head differential not exceed 6 ft in order not to incur greatly increased pumping costs
10) Be entirely automatic in operation
11) Be easily adapted to existing systems
12) Be relatively low in cost. However, the function accomplished by this device should warrant that price should not be a prime factor in its selection or design
13) Operating elements should be readily removable for cleaning and inspection.

Must Recognize Problem

The most essential step to the general solution to this problem of thermal shock is the recognition of the problem. As stated earlier, too many incidents of thermal shock have been officially recorded as "defective materials" or "defective workmanship" or "causes unknown." This poor analysis has resulted in nothing being done to prevent a recurrence of damage.

Insurance companies and their inspectors, state boiler inspection agencies, consulting engineers, heating, piping, and air conditioning contractors, and plant and building engineers should be aware of conditions which promote thermal shock, and the steps required to eliminate these conditions. ‡

The author wishes to credit Arthur E. Johnson, service manager, and William R. Frew, control engineer, both of Young-Streeter Co., for assistance in preparing this article.

Do You Know Enough About Contracts?

Many of the dealings of the heating, piping, and air conditioning contractor are governed by the law of contract. Here's a brief rundown of types of contracts and their characteristics.

BY EARL W. MOUNCE
Professor of Law
University of Maryland

and

ROBLEY D. STEVENS
Management Consultant

MAKING or breaking a business contract is nothing new. Almost every heating, piping, and air conditioning contractor is regularly faced with the task. Thus, business law governs his everyday activities to quite a degree.

It is not necessary that he be a legal expert, but he should familiarize himself with some basic legal points. Legal mistakes in his business dealings can be very costly, so it is worth his while to combine a layman's knowledge of business law with his mechanical skills.

He may not realize it, but he probably enters into hundreds of business contracts—oral, implied, or written—during the course of a year. Under such contracts he has incurred legal liabilities. At the same time he has created legal rights for himself. He can be at a disadvantage if he does not know and understand his legal rights and obligations as given and imposed by contract law.

Thus, it can be helpful to him to know what a contract is, what it involves, and when it must be in writing to be enforceable.

First, he should understand that he is not compelled by law to enter into a particular business contract. If he should enter into such a contract, the rights and duties which he has will be derived from his *voluntary agreement* thereto.

The court will not make a contract for him. But if he and another party have voluntarily entered into a legally enforceable contract, the court will interpret and enforce it as such.

What is a Contract?

A contract may be defined as a promise or promises for the breach of which the law gives a remedy, or the performance of which the law in some way recognizes as a duty.

There are various types of contracts. These may be classified as follows:

The *contract-under-seal* is the common example of a formal contract. It was the first type of contract to be recognized and enforced by the court. It had to be written, signed, and sealed. Today, however, in a number of states the requirement of the seal has been abolished.

A contract is said to be an *express contract* if the parties to it expressly state the terms of the agreement. The intentions of the parties to a contract and the terms of the agreement may be in writing or orally entered into.

An *implied contract* is a contract inferred from the acts or conduct of the parties and the surrounding conditions involved. The terms of the contract and the intentions of the parties are not expressed orally nor in writing, but the actions and the conduct of the parties indicate an intention to contract.

An express contract is proved by introducing the written contract, or, if the contract was orally entered into, by introducing evidence to what the parties said. An implied contract is proved by introducing evidence to the acts of the parties.

An *executed contract* is one that has been fully and completely performed by all the parties to the contract.

An *executory contract* is one that has not been performed by either party. Under its terms, performance is to take place at some future time.

A *bilateral contract* is one in which the parties exchange mutual promises. The promises are reciprocal. There is an exchange of a promise for an act. The offeror promises an act or forebearance for an act on the part of the offeree.

A *void contract* is one that has no legal effect. It is one which the court will not enforce.

A *voidable contract* is one that has full legal effect as to one of the parties, but is not enforceable against the other party against his will.

An *unenforceable contract* is one that meets the requirements or essentials of a valid contract but, for some reason, may not be enforced by the court.

Thus, a contract arises out of the voluntary agreement between parties. The obligations imposed by the contract are self imposed since the parties freely entered into the contract.

What Makes a Contract?

A legal, enforceable business contract consists of the following elements: mutual assent, capacity to contract, consideration, and legality of subject matter.

Mutual assent involves an offer, a communication of the offer, an acceptance of the terms of the offer, and a communication of the acceptance. Sometimes the courts term mutual assent as being a "meeting of minds." Again, this must be voluntarily arrived at. The bargain or agreement between the contractor and the other party must not have resulted from fraud, duress, undue influence, nor mistake.

The contractor and the other party must have *legal capacity to contract.* If he and/or the other person have no such capacity, the contract will not be enforceable, even though mutual assent exists.

There must be *legal consideration* in every agreement. Every contract is an agreement, but not every agreement is a contract. We make many agreements daily. But many of these are not contracts since they do not create legal obligations.

For example, an agreement to attend a convention of heating, piping, and air conditioning contractors with someone is an agreement, but it is not a contract. The agreement does not create a legal obligation. Instead, it creates only a social obligation. The reason why the agreement does not contain legal obligation—and hence, become a binding contract—is that it does not contain what is known as consideration.

Consideration is not necessarily limited to the giving or payment of money. While that does constitute "valuable" consideration, it is not the only method of giving consideration. Legal consideration is found in the mutual promises of the parties if they surrender a legal right by making the promise.

The final element of a valid contract is *legality of subject matter.* Obviously, the stipulations of a contract must be within the law.

When is One Enforceable?

Not all contracts can be enforced. The law states that certain types must be in writing to be enforceable. Among these are contracts to answer for the debt, default, or miscarriage of another. For example, A tells B to sell some piping material to C and agrees that if C does not pay, he, A, will pay the bill. This promise of A's must be in writing to be enforced.

Agreements that may not, under their terms, be personally performed within one year also must be written. If A orally agrees to employ B as a bookkeeper on January 1, with work to start on January 5, neither party can enforce the agreement, because it could not be performed within one year from the date it was made.

Other contracts required to be in writing are agreements to sell personal property above a certain amount, usually $50.00, unless there has been part payment or part delivery.

Who Has Rights in a Contract?

Only the parties to a contract have any rights or duties under same. However, all rights under a contract may be assigned, without the consent of the other party, if the contract has not been made "nonassignable" by its terms.

If disagreement arises between the parties to a contract and the controversy goes to court, the court will decide whether or not a contract actually exists, and, if it does, what the rights and duties of the parties are under the contract.

When is a Contract Discharged?

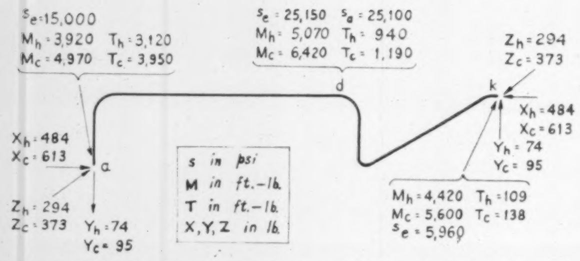
Contracts are discharged by performance, agreement of both parties, impossibility of performance, and by operation of law.

A *breach* of a business contract by one of the parties gives the other a right of action for damages and, under certain conditions, will discharge him from further duty to perform. This being the case, the contractor should keep a copy of every business contract he signs. Without a genuine copy, he may have difficulty proving what the contract actually involved.

Before entering into any business contract he should be sure that it is clear and understandable. It should contain all the details which are intended to govern the transaction. In the eyes of the law, there can be but one contract, and any change in the terms of the contract involves certain hazards often leading to misunderstanding.

The heating, piping, and air conditioning contractor can be absolutely safe by having all his business contracts examined by an attorney. By so doing, he will be able to handle his transactions more efficiently and economically, without concerning himself about possible legal pitfalls. ‡

This discussion has been very general. It should be remembered that legal rules vary in different states.



3a SUMMARY OF RESULTS for three-dimensional piping of Fig. 3 presented here

Calculating Pipe Stress Efficiently

This is the third and concluding article in a series presenting a working method designed to correctly and efficiently calculate piping stresses. The procedure is based on the 1955 American Standard Code for Pressure Piping.

The first and second articles in the series appear in the September and December 1957 issues.

BY K. HAO HSIAO
Consultant for Piping Stress Analysis

To SUMMARIZE the results from analyzing the system in Fig 3, it is necessary to complete computations by obtaining the hot and cold forces for Y and Z, hot and cold moments and torques and stress ranges at the ends of piping as well as those at the point of maximum moment d.

Assume that the piping in Fig. 3 is connected at a with a welding tee and at k to a nozzle. Then, the stress intensification factor of 1.3 for average anchor condition may be used for piping at nozzle, and that for welding tee is obtained as follows:

$$h = 4.4\ (t/r) = 4.4\ [2\ (0.18)/(12.75 - 0.18)] = 0.126$$
$$i = 0.9/(0.126)^{2/3} = 3.6$$

the moment and torque ranges at a are

$$M_a = M'_a Z = 560\sqrt{12.41^2 + 4.71^2} = 7450 \text{ ft-lb}$$
$$T_a = T'_a Z = 560\ (10.58) = 5930 \text{ ft-lb}$$

Hence, the stress range at a is obtained from Equation 19 as below:

$$S_b = 3.6(7450)12/22 = 14{,}630 \text{ psi}$$
$$S_t = 5930(12)/2(22) = 1617 \text{ psi}$$
$$S_e = \sqrt{14{,}630^2 + 4(1617^2)} = 15{,}000 \text{ psi}$$

The values of M_k and T_k having been obtained in Table 2, the stress range at k can be readily obtained as follows:

$$S_b = 1.3(8400)12/22 = 5960 \text{ psi}$$
$$S_t = 207(12)/2(22) = 56.5 \text{ psi}$$
$$S_e = \sqrt{5960^2 + 4(56.5)^2} = 5960 \text{ psi}$$

Comparison of the above two S_e values with S_e at d indicates that the latter is controlling. The required hot and cold reactions can be obtained by tabulation as below:

From Equation 18, for $c = 0.5$

$$[1 - (2/3)c]\ E_h/E_c = 2/3\ (21.6/27.4) = 0.526$$
$$1 - (S_h/S_e)\ (E_c/E_h) = 1 - (6600/25{,}150)\ (27.4/21.6) = 0.667$$

Range	Conversion factor	At d		At k		At a		At a and k	
		M_d 9640	T_d 1788	M_k 8400	T_k 207	M_a 7450	T_a 5930	Y 142	Z 560
Hot	0.526	5070	940	4420	109	3920	3120	74	294
Cold	0.667	6420	1190	5600	138	4970	3950	95	373

The above numerical results together with X_h, X_c, S_e and S_a at d already obtained are shown diagrammatically in Fig. 3a.

Example 2. In this example, a single plane system subjected to expansion perpendicular to its own plane is analyzed. This system, shown in Fig. 4, is the same as that portion in XY plane of the system in Fig. 3, except (1) fg is changed to a straight branch 18 in. long, and (2) the end g is connected to a large diameter header at the same temperature and anchored at a distance 20 ft away from g. If this connection is a welding tee, the stress intensification factor at the connection is: $0.9/h^{2/3}$, where $h = 4.4(t/r)$.

For expansion, the system in Fig. 4 is fixed at the anchors, but for flexibility, it is assumed to be fixed at points *a* and *g*, due to the great stiffness of the header.

Equating $I_{xz} = I_{yz} = 0$ in Equations 4, 5, and 6 we have:

$$X - Y(I_{xy}/I_x) = (\Delta_x E_c I)/(1728 I_x) \quad \text{[24]}$$

$$-X + Y(I_y/I_{xy}) = (\Delta_y E_c I)/1728 I_{xy} \quad \text{[25]}$$

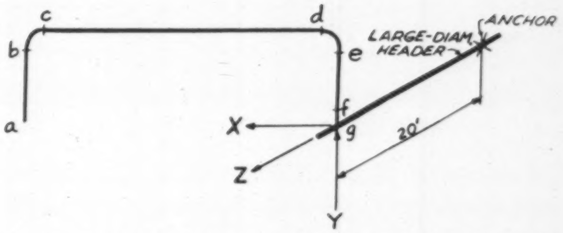
$$Z I_z = (\Delta_z E_c I)/1728 \quad \text{[26]}$$

It is seen from these equations that the force acting in the direction of *Z* axis is independent of expansions in the plane of the system, and the forces acting in the same plane are also independent of expansion along *Z* axis. To obtain line inertias in the above equations, we use Table 3, which is a modified version of Table 1. Owing to the similarity between systems in Figs. 3 and 4, the calculated numerical values in Table 1 for members *ab* to *ef* inclusive are retabulated in Table 3.

Substituting the coefficients from Table 3 in Equations 24, 25, and 26, we have:

$$X + 0.056Y = 36{,}850$$
$$-X - 1467Y = 0$$
$$13{,}503Z = 5{,}840{,}000$$
$$Z = 432 \text{ lb}$$
$$Y = -25 \text{ lb}$$
$$X = 36{,}850 \text{ lb}$$

Thus, by reducing the flexibility of a three dimensional system to that of a single plane system, while maintaining the same expansion in three directions, the force *X* becomes prohibitively large. The negative sign of *Y* force indicates that its direction is opposite to that assumed in Fig. 4. The above values for *X*, *Y*, and *Z* are force ranges, from which the moment ranges and the hot and cold forces, moments, and torques can be calculated in a similar manner to Example 1.



4 SINGLE PLANE SYSTEM subjected to expansion perpendicular to its own plane is fixed at the anchors. But for flexibility, it is assumed to be fixed at points *a* and *g* due to the great stiffness of the header

If end *g* of the system in Fig. 4 is fixed with respect to translatory motions, but is free to rotate, then it is like a hinged end. In this case, the *X*, *Y*, and *Z* axes shown in Fig. 4 are also the final axes, thus eliminating the necessity of calculating $\overline{px}$, $\overline{py}$, and $\overline{pz}$. Table 3 is then reduced to Table 4, which indicates greater line inertia values or greater flexibility, resulting in smaller expansion forces. ($X = 2840$ lb, $Y = 800$ lb, $Z = 164$ lb)

Similar changes can be made in Table 1 to adapt it to a three dimensional system with one end hinged. This is accomplished by eliminating *Lx*, *Ly*, and *Lz* columns and reducing *XY*, *XZ*, and *YZ* tables to nine line inertia values, i.e., I'_x, I'_y, I'_z, I''_x, I''_y, I''_z, I_{xy}, I_{xz}, I_{yz}.

Reductions and Modifications of Table 1 for Special

		DESIG	x	y	L^3	L	Lx	Lx^2	Ly	Ly^2	Lxy	TABLE 1 ROW NO.
BRANCHES Y		ab	27.7	3.2	262.1	6.4	177	4900	20.5	65.5	566	
		ef	0	3.95	117.6	4.9	0	0	19.4	76.5	0	
		fg	0	.75	3.4	1.5	0	0	1.1	.8	0	
	(1)	SUM			$I_2 = 383.1$	12.8	177	4900	41.0	142.8	566	(3)
	(2)	0.3×SUM				3.8	53.1	1470				(4)
BRAN. X		cd	13.85	7.9	15069	24.7	342	4740	195.2	1543	2700	
	(3)	SUM			$I_3 = 15069$	24.7	342	4740	195.2	1543	2700	(5)
	(4)	0.3×SUM				7.4			58.6	463		(6)
ELBOWS XY		bc	L = 1				27.16	737	7.36	54.2	200	
		de					.54	.3	7.36	54.2	4	
	(5)	SUM				NO. OF ELLS 2	27.70	737.3	14.72	108.4	204	(7)
	(6)	(5)×β	$\beta = 22.6$			45.2	625	16680	333	2450	4610	(8)
	(7)	(5)×α	$\alpha = 24.9$			49.8	690	18,370	366.5	2700	5080	(14)
BASIC SUM	(8)	(1)+(3)+(7)				87.3	1209	28,010	602.7	4386	8346	(15)
XY	(9)	Σ=(6)+(8)				132.5	1834	44,690	935.7	6836	12,956	(16)
	(10)	(9)÷ΣL					$\bar{x} = 13.85$		$\bar{y} = 7.07$			(17)
	(11)	(10)×Σ					$\bar{x}\Sigma Lx = 25{,}400$		$\bar{y}\Sigma Ly = 6620$		$12{,}970 = \bar{y}\Sigma Lx$	(18)
	(12)	(9)−(11)					$I'_y = 19{,}290$		$I'_x = 216$		$-14 = I_{xy}$	(19)
XZ	(13)	Σ=(2)+(8)				91.1	1262.1	29480				(20)
	(14)	(13)÷ΣL					$\bar{x} = 13.85$					(21)
	(15)	(14)×Σ					$\bar{x}\Sigma Lx = 17{,}500$					(22)
	(16)	(13)−(15)					I'_z 11,980					(23)
YZ	(17)	Σ=(4)+(8)				94.7			661.3	4849		(24)
	(18)	(17)÷ΣL							$\bar{y} = 6.98$			(25)
	(19)	(18)×Σ								$\bar{y}\Sigma Ly = 4615$		(26)
	(20)	(17)−(19)								I_z 234		(27)

$I'_x = 216$
$I_{2/12} = 32$
$I_x = 248$

$I'_y = 19{,}290$
$I_{3/12} = 1{,}257$
$I_y = 20{,}547$

$I'_z = 11{,}980$
$I''_z = 234$
$I_{2/12} = 32$
$I_{3/12} = 1{,}257$
$I_z = 13{,}503$

COEFFICIENTS

$$-\frac{I_{xy}}{I_x} = -\frac{-14}{248} = .056 \qquad \frac{\Delta_x E_c I}{I_x 1728} = \frac{4.1(27.4)10^6(140.5)}{248\,(1728)} = 36{,}850$$

$$\frac{I_y}{I_{xy}} = \frac{20{,}547}{-14} = -1467 \qquad \frac{\Delta_y E_c I}{I_{xy} 1728} = 0$$

$$\frac{\Delta_z E_c I}{1728} = \frac{2.62(27.4)10^6(140.5)}{1728} = 5.84(10^6)$$

TABLE 3—MOMENTS AND PRODUCTS OF INERTIA for any simple single plane system may be tabulated as shown here

		DESIGNATION	X	Y	L^3	L	Lx^2	Ly^2	Lxy
BRANCHES Y		ab	27.7	3.2	262.1	6.4	4,900	65.5	566
		ef	0	3.95	117.6	4.9	0	76.5	0
		fg	0	0.75	3.4	1.5	0	.8	0
	(1)	SUM			$I_2 = 383.1$		4,900	142.8	566
	(2)	(1)×0.3					1,470		
BRANCH X		cd	13.85	7.9	15,069	24.7	4,740	1,543	2,700
	(3)	SUM			$I_3 = 15{,}069$		4,740	1,543	2,700
	(4)	(3)×0.3						463	
ELBOWS XY		bc	27.16	7.36	L = 1		737	54.2	200
		de	0.54	7.36			0.3	54.2	4
	(5)	SUM					737.3	108.4	204
	(6)	(5)×β	$\beta = 22.6$				16,680	2,450	4,610
	(7)	(5)×α	$\alpha = 24.9$				18,370	2,700	5,080
	(8)	(1)+(3)+(7)					28,010	4,386	8,346

XY	(6)+(8)	I'_y 44,690	I'_x 6,836	12,956 I_{xy}
XZ	(2)+(8)	I'_z 29,480		
YZ	(4)+(8)		I''_z 4,849	

I'_x 6,836
$I_{2/12}$ 32
I_x 6,868

I'_y 44,690
$I_{3/12}$ 1,257
I_y 45,947

I'_z 29,480
I''_z 4,849
$I_{2/12}$ 32
$I_{3/12}$ 1,257
I_z 35,618

COEFFICIENTS

$$-\frac{I_{xy}}{I_x} = -\frac{12{,}956}{6{,}868} = -1.88 \qquad \frac{\Delta_x E_c I}{I_x 1728} = \frac{4.1(27.4)10^6(140.5)}{6868\,(1{,}728)} = 1{,}330$$

$$\frac{I_y}{I_{xy}} = \frac{45{,}947}{12{,}956} = 3.54 \qquad \frac{\Delta_y E_c I}{I_{xy} 1728} = 0$$

$$\frac{\Delta_z E_c I}{1728} = \frac{2.62(27.4)10^6(140.5)}{1728} = 5.84 \times 10^6$$

TABLE 4—MOMENTS AND PRODUCTS OF INERTIA, reduced from Table 3, show greater line inertia values or greater flexibility, resulting in smaller expansion forces

Cases. Fig. 4 is a special case of a single plane system. Eliminating rows 2, 4, and 6 and those portions of Table 3 under headings XZ and YZ, and changing row 7 to (7) = (5) x KL_a, we obtain a table for calculating I_x, I_y, and I_{xy} for any single plane system not subjected to expansion perpendicular to its own plane. Substituting the above line inertias in Equations 24 and 25, we can solve for the forces X and Y, which equal the X and Y forces obtained for the system in Fig. 4. Thus, Table 1, when reduced to the form of Table 3, provides a tabulation procedure for the particular case in Example 2 or other similar cases. When reduced further, Table 3 provides a means of tabulation for any simple single plane system.

Eliminating that portion of Table under headings Elbows, Table 1 is transformed into a simpler form for an approximate solution for a system assumed to be square cornered.

If the elbows of the system in Fig. 3 are changed to mitre bends, all the numerical values above row 14 of Table 1, calculated for Example 1, can be used with the insertion of new values for rows 8, 10, and 12. These new values are calculated, using new β factor obtained as follows:

Applying Equations 12, 13, 14, 15, 16, 17, and 20 to the piping in Fig. 3, we have:

$$h = [(1 + \cot 22.5 \text{ deg})/2]\ (0.180/6.285) = 0.0489$$
$$K = 1.52\sqrt[3]{(0.0489)^{1/2}}/0.0489 = 18.8$$
$$R = [6.285\ (1 + \cot 22.5 \text{ deg})]/2 = 0.9 \text{ ft}$$
$$L_a = [\pi(0.9)]/2 = 1.41 \text{ ft}$$
$$\alpha = [(18.8 + 1)/2]\ 1.41 = 13.95 \text{ ft}$$
$$\beta = [(18.8 - 1)/2]\ 1.41 = 12.55 \text{ ft}$$

The above interchangeable use of numerical data in Table 1 is based on the assumption that the location of

---

Nomenclature

L = length of each piping branch, ft

x, y, z = coordinates of the centroid of each piping branch or elbow with respect to the original arbitrarily chosen X, Y, and Z axes, ft

$\overline{x}, \overline{y}, \overline{z}$ = coordinates of the centroid of piping system with respect to the original arbitrarily chosen X, Y, and Z axes, ft

I_x, I_y, I_z = moments of inertia of the system about its centroidal axes, ft^3 (magnified 12 times)

I_{xy}, I_{xz}, I_{yz} = products of inertia of the system about its centroidal axes, ft^3

I_1 = centroidal moment of inertia of branches parallel to Z axis, ft^3 (magnified 12 times)

I_2 = centroidal moment of inertia of branches parallel to Y axis, ft^3

I_3 = centroidal moment of inertia of branches parallel to X axis, ft^3

I_{ox}, I_{oy}, I_{oz} = sums of centroidal moments of inertia of elbows about their own respective neutral axes, ft^3

m = number of elbows in planes parallel to the axis of I_o

n = number of elbows in planes perpendicular to the axis of I_o

$I_{oxy}, I_{oxz}, I_{oyz}$ = sums of centroidal products of inertia of elbows parallel to the plane of inertia, ft^3

$\Delta x, \Delta y, \Delta z$ = total thermal expansion of the system in the X, Y, and Z directions respectively, in.

E_h = modulus of elasticity of the piping material at operating temperature or in the hot condition, psi

E_c = modulus of elasticity at installation temperature or in the cold condition, psi

I = moment of inertia of the cross-sectional metal area of the pipe, in^4.

S = section modulus of pipe, in^3.

D = outside diameter of pipe, in.

t = thickness of pipe wall, in.

r = mean radius of pipe, in.

T = temperature, F

e = thermal expansion in 100 ft of pipe due to a rise from installation temperature to operating temperature, in. per 100 ft

R = radius of curvature of elbow or quarter bend, ft

X, Y, Z = forces due to expansion, lb

M_{xy}, M_{xz}, M_{yz} = bending moments due to X, Y, and Z forces in XY, XZ, and YZ planes (one of these moments is actually a torque) ft-lb

X', Y', Z' = relative force values

$M'_{xy}, M'_{xz}, M'_{yz}$ = relative moment values in XY, XZ, and YZ planes

M'_d, M_d = relative and absolute values of combined bending moment at point d of the system, ft-lb

T'_d, T_d = relative and absolute values of torque at point d, ft-lb

h = characteristic factor

K = flexibility factor

L_a = actual length of elbow or quarter bend, or effective length of mitre bend, ft

i = stress intensification factor

α = transverse virtual length, ft

β = differential virtual length, ft

θ = one-half angle between adjacent mitre axes, degrees

c = cold spring factor

X_h, X_c = values of X force in hot and cold conditions, lb

s_b = maximum bending stress, psi

s_t = corresponding torsional stress, psi

s_a = allowable stress range, psi.

f = stress range reduction factor. ($f = 1$ for 7000 or less temperature cycles over expected life of piping.)

(1) to (27) = numerals each representing one row of figures

A, B, C = symbols each representing one numerical value

(a), (b), (c) = symbols each representing three values, A, B, and C

N = total number of elbows in a system

N_{xy} = number of elbows parallel to XY plane

$\gamma=32.2$	SUM ELBOWS		NO. ELBOWS 4	27.16	737.6	15.26	108.7	-20	378.3	204	10.5	-.3
	(7)	γ x SUM	128.8	875	23,750	491	3,500	-644	12,180	6,570	338	-9.7
BASIC SUM	(8)	(1)+(3)+(5)+(7)	181.8	1394	33,390	726.1	5,185	-814	13,880	9,836	338	-9.7
XY	(9)	Σ =(2)+(8)	186.9	1394	33390	726.1	5,185			9,836		
	(10)	(9)÷ΣL		$\bar{x}$ 7.46		$\bar{y}$ 3.88						
	(11)	(10)×Σ		$\bar{x}\Sigma Lx$ 10,400		$\bar{y}\Sigma Ly$ 2,820			$\bar{y}\Sigma Lx$ 5,410			
	(12)	(9)−(11)		I'_y 22,990		I'_x 2,365			I_{xy} 4,426			
XZ	(13)	Σ=(4)+(8)	185.2	1,447.1	34,860			-814	13,880		338	
	(14)	(13)÷ΣL		$\bar{x}$ 7.82				$\bar{z}$ -4.39				
	(15)	(14)×Σ		$\bar{x}\Sigma Lx$ 11,300				$\bar{z}\Sigma Lz$ 3,575		$\bar{z}\Sigma Lx$ -6,360		
	(16)	(13)−(15)		I'_z 23,560				I''_x 10,305		I_{xz} +6,698		
YZ	(17)	Σ=(6)+(8)	189.2			784.7	5,648	-814	13,880			-9.7
	(18)	(17)÷ΣL				$\bar{y}$ 4.15		$\bar{z}$ -4.3				
	(19)	(18)×Σ				$\bar{y}\Sigma Ly$ 3260		$\bar{z}\Sigma Lz$ 3,500			$\bar{z}\Sigma Ly$ -3370	
	(20)	(17)−(19)				I''_z 2,388		I''_y 10,380			I_{yz} 3,360	

TABLE 5—MOMENTS AND PRODUCTS OF INERTIA are shown here on the lower portion of Table 1

centroid of each mitre bend is close to that of its corresponding elbow.

$$i = 0.9/(0.0482)^{2/3} = 6.75$$

When the piping system contains branches and elbows with different cross-sectional moments of inertia I_1, I_2, I_3, . . . I_n, of which the number of sections with I_n is predominant, then we apply ratios I_n/I_1, I_n/I_2, . . . I_n/I_{n-1} to the lengths and centroidal line inertias of members with cross-sectional moments of inertia other than I_n, and substitute I_n for I in Table 1. For instance, if branch *ab* of the system in Fig. 3 is changed to 10 in. diameter, Schedule 10S (I = 76.9 in.⁴). Since, in this case, the number of 12 in. pipe is predominant, we apply the ratio 140.5/76.9 = 1.83 and obtain the following values:

$$L_{ab} = (1.83)\ (6.4) = 11.7 \text{ ft}$$
$$I_2 = (1.83)\ (262.1) + 117.6 = 597.6 \text{ ft}^3$$

Replacing values for branch *ab* in Table 1 of Example 1 with the above values, we obtain the tabular solution for this piping system.

Changes in the formulas and application of the flexibility factor K and stress intensification factor i are two of the most significant code changes published in the 1955 ASA Code for Pressure Piping. Such changes may well reoccur in future codes, but the tables presented in this paper are still applicable. For instance, if the flexibility factor for bending is changed from K to K_1, and that for torsion, from unity to K_2, then the new transverse and differential virtual lengths are

$$\alpha = [(K_1 + K_2)/2]\ L_a$$
$$\beta = [(K_1 - K_2)/2]\ L_a$$

The above factors will be applied in Table 1 for calculations of line inertias.

Mean Virtual Length of Elbow. The mean virtual length of an elbow is the average value of the virtual length KL_a for in-plane bending and the two transverse virtual lengths α for bending in the other two planes. Hence, it is defined as:

$$\gamma = (KL_a + 2\alpha)/3 = [KL_a + [KL_a + (K + 1)\ L_a]/3 = [(2K + 1)/3]\ (L_a)\ \ldots\ldots\ldots\ldots.[27]$$

Applying this factor to Equations 7, we have, for I'_x, the following changes:

$$\left.\begin{array}{l} \alpha\sum^{i=\text{all elbows}} y_i^2 \ +\beta\sum^{i=\text{elbows}\parallel XY} y_i^2 \longrightarrow \gamma\sum^{i=\text{all elbows}} y_i^2 \\ \alpha\sum^{i=\text{all elbows}} y_i \ +\beta\sum^{i=\text{elbows}\parallel XY} y_i \longrightarrow \gamma\sum^{i=\text{all elbows}} y_i \end{array}\right\} \cdots\cdots\cdots\cdots [28]$$

Similar changes occur for line inertias in other planes. The resulting simplification is the elimination of rows 7 to 12 inclusive in Table 1. Also, the calculations for rows 9, 13, and 17 become additions of two rows each, instead of three rows. For the system in Fig. 3,

$$\gamma = [[2(20.1) + 1]/3] \times 2.35 = 32.2$$

The numerical calculations are shown in Table 5, which is the lower portion of Table 1. The data in the upper portion of the original Table 1, i.e., the numerical values under "branches" and those for individual elbows, are still applicable in this case.

The greatest force obtained from Table 5 is X = 1003 lb or 9 percent larger (on the conservative side) than that of Table 1. The maximum bending moment calculated from X, Y, and Z forces is 18 percent greater than that of Table 1. Thus, the use of mean virtual length provides an approximate, simplified solution. It should be remembered in this connection that piping flexibility calculations, however precisely made from a mathematical standpoint, will always remain approximate due to the multitude of assumptions involved. The formula for γ, i.e., Equation 27, should be further refined to include a factor, which varies as a function of the distribution of elbows among the three planes. Such a factor would improve the accuracy and cause the numerical results to approach those in Table 1. ⧺

4 STEPS TO AIR CONDITIONING

The engineer takes four major steps en route to the design of an air conditioning system. How the first and most important—defining the problem—should be accomplished is described here.

THE DESIGN air conditioning engineer is in a somewhat ambiguous professional position. Although primarily trained in the art and science of engineering, he is nonetheless very likely to be held responsible for combining the knowledge, data, and opinion from a number of fields not directly related to engineering.

When this manifests itself as an air conditioning system, the engineer is often judged by the effectiveness and the economy of its operation. Yet, his exercise of judgment may have had little to do with the conditions which control that system's effectiveness or economy.

To illustrate this, the stages of air conditioning design may be broken down into four parts. These are, in the order in which they occur:

1) Defining the problem
2) Evaluating the thermal load
3) Designing the system for extreme loads
4) Controlling the system for effective operation under partial load.

The second, third, and fourth steps all involve direct and relatively simple application of fundamental engineering principles and procedures. Each of these last three steps can be carried out with reasonable expectation of a high degree of accuracy, hence with close agreement between the actual and the calculated solutions of the problem. However, an accurate solution to an erroneously defined problem may lead to dissatisfaction.

Therefore, the analysis which follows will demonstrate that the first and most important of the four design steps is one which is largely beyond the control of the engineer. Lacking such control or accurate information on which to base a definition of the problem, it is obvious that the engineer's skill, accuracy, and experience in design can do but little toward establishing an effective solution if the problem has been ill defined.

Defining Problem Requires Outside Help

As we all know, the basic purpose of an air conditioning system is to transfer energy as heat either to or from the space which is being conditioned.

The required rate of heat transfer under conditions of maximum load is the most important criterion needed for definition of the air conditioning problem. Yet, the rate of heat transfer is dependent on and determined by the imposed outside thermal conditions, the desired inside thermal conditions, and the thermal effectiveness of the structure which is between the inside and outside atmospheres as a barrier.

Thus, the engineer is dependent upon the climatologist for evaluation of the expected external conditions, upon the physiologist for information concerning the required internal conditions, and upon the architect for data on the static thermal qualities of the proposed shelter. Incomplete data from the climatologist, inadequate data from the physiologist, or thermally uneconomical plans from the architect would produce either an erroneous statement of the problem or a statement which, though correct, would be uneconomical.

Evaluate Outside Conditions

The factors external to the structure which affect its thermal load are the temperature, humidity, and velocity of the air, plus the solar effect. More than just knowing what these are, an accurate problem statement requires knowledge of how they vary with respect to one another, of how rapidly any one factor may undergo change with respect to time, and of what the duration is likely to be of any given set of conditions.

For many years an approximate design procedure was based on evaluation of the thermal load associated with a selected maximum design value of the outside dry bulb temperature. Now, it is well established that such a procedure serves only to partially define the problem, and its use may lead to markedly erroneous results.

For adequate problem definition the engineer must still select a maximum design outside dry bulb temperature, but he must also determine the value of the coinciding outside wet bulb temperature. A converse climatological requirement is the selection of a maximum design wet bulb temperature and knowledge of the coinciding out-

DESIGN

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side dry bulb temperature. Additional requirements include knowledge of the maximum and minimum ranges of dry bulb and wet bulb temperatures.

Of equal importance in precisely defining the problem is knowledge of the expected, or anticipated, or probable transient and periodic changes in any of these variables. With an extremely heavily walled structure, for example, solar effect may be almost negligible since the incidence within the structure of solar load may be so long delayed that it will occur during the night hours. Likewise, the maximum inside effect of maximum outside air temperature may be delayed by many hours. In cases where wide periodic daily changes in outside thermal conditions are experienced, the type of structure may dampen the amplitude to such a value that realized load has very little resemblance to load as calculated in terms of maximum outside temperatures.

In short, the engineer can no longer be satisfied with mere knowledge of what particular external conditions exist at a given time. He must know also what conditions existed previously and what conditions, as a function of time, are to be expected for the future. Only when the complete outside thermal history is available is it possible to use effectively and accurately this data to assist in complete definition of the problem.

Determine Desired Inside Conditions

Equally as important as knowledge of outside thermal conditions is knowledge of what inside conditions are desired and how they are to be varied daily. The inside thermal environment is determined by air temperature, mean radiant temperature of surrounding surfaces, localized radiation (as from lights), absolute and relative humidities, and air motion.

If the air conditioning system is to maintain fixed internal conditions with respect to time, the design problem is somewhat simplified. In most systems, however, the nighttime thermal environment will differ from that during the day. Therefore, the transient effect of either "heating up" or of "pulling down" will require analysis.

Even for steady state inside conditions, the selection of the most effective wet and dry bulb temperatures is often a difficult problem. Contrary to popular opinion health, comfort, and efficiency are not necessarily synonomous. Each may correspond to a different type of thermal environment.

In some naval vessels, for example, air conditioning is utilized as a means of reducing thermal extremes so that unhealthful conditions will not exist. Often, this reduction is not sufficient to provide comfort. The exposed subjects, though healthfully air conditioned, are practically as uncomfortable as they were without the conditioning. As a more common example of the same paradox, a person leaving a hot bath and entering a conditioned room might well be subject to an unhealthful rate of cooling if the room temperature were low enough to provide optimum comfort conditions.

With respect to efficiency the situation is even more extreme. If an employer desired to obtain a maximum rate of piece work from women operating sewing machines over a limited time period, he could create an optimum environment by doing such things as raising the temperature significantly above the values which occur in the comfort range; sealing the room and raising the barometric pressure to something over two atmospheres; increasing the lighting so that the intensity at work level exceeded that needed for good sight; and maintaining a steady and high noise level. The irritating effect of excessive temperature, pressure, light, and noise would each serve — over a short work period — to affect the nervous system of the average occupant in such a way that the work rate would go up, even though conditions within the space would be neither comfortable nor healthy.

Even when the purpose of an air conditioning system is to provide occupant comfort, the problem of definition remains a serious one. The so-called "comfort chart" may be, in reality, a discomfort chart. Statistically, it provides accurate data on regions of discomfort, but is applicable only to a *majority* of average individuals when considered in terms of indoor comfort.

In a room or similar small enclosure an effective air conditioning system must meet the actual needs of the particular occupants, rather than the statistical needs of the hypothetical average man. Thus, selection of optimum inside conditions will depend upon the occupants; on their age, weight, sex, physical health (metabolism in diabetics and alcoholics may depart widely from that of the average man), and mental health or emotional response. For example, in movie theaters the load on the air conditioning system varies as a function of the extent to which the audience emotionally participates in the scene which is appearing on the screen.

It is evident, therefore, that selection of desired inside conditions means, in reality, the selection of a range of inside conditions within which the actual state point can then be selected by the individual occupant. Even in selection of the proper range, however, the engineer must be aided and guided by the type of installation, the conditions of occupancy, and the availability of adequate physiological and psychological data.

How Effective is Thermal Shield?

With outside and inside design temperatures established, the thermal driving force or potential is known. The final step for definition of the problem is to determine the resistance which is to be interposed by the barrier between the conditioned environment and the outside atmosphere. At an ever increasing rate, architects and engineers are working together to establish thermally acceptable structures. But there are yet all too many instances, particularly in small construction, where the engineer sees only the final plans and specifications. Hence, he is often called on to provide excessive conditioning to compensate for a thermally poor structure.

The distinction between the structure as a static device for reducing the load and the air conditioning system as a dynamic means for carrying the load is a vital one.

The static thermal effectiveness of the structure is primarily a preventative method of reducing the load so that lesser cost will be required for air conditioning. Unfortunately, a thermally poor structure is not apparent to its owner until it has been completed and the conditioning system placed in operation. It is then that high operating costs bring out the poor economy.

The thermal purpose of any structure is to establish a barrier between its inside and outside environments. This barrier may be extremely tight so far as mass transfer by infiltration is concerned. At the same time, it may be almost valueless as a means for minimizing heat transfer. The reverse may also be true. A structure may be well insulated to provide an effective resistance to heat transfer, yet be so loosely constructed that serious losses may occur due to infiltration.

When given the opportunity, the engineer should work with the architect to modify the thermal characteristics of the proposed structure in such a way as to establish the most economic combination of static thermal structure with dynamic remedial conditioning.

Provide "Preventative" Air Conditioning

A carefully designed thermal structure provides "preventative" air conditioning three ways: through provision of adequate resistance to the direct transfer of heat; by establishing a time lag between maximum outside conditions and maximum inside load; and by reducing, internally, the load variation that would apply if the structure were without thermal capacity. These characteristics deserve separate consideration:

1) *Thermal Resistance.* All materials offer resistance to heat transmission and, therefore, provide some degree of insulation. The range of effectiveness among materials varies by a factor of 10,000. So, the need is evident for selecting an insulation which, in small mass and volume, will provide the required thermal resistance. A 6 in. wall of cork, for example, provides thermal resistance equal to that which would be obtained from a wall of sterling silver 1 mile thick.

Based on the size, type, and location of the structure the engineer can recommend use of an insulation which will provide minimum overall conditioning costs.

In addition to use of insulations, reflective surfaces such as metal foil may be effectively used to prevent absorption of solar radiation. These surfaces are not actually insulations in the true sense of the word, since they do not impose a thermal resistance. But their effect is equivalent to that of usual types of insulation.

Shading — as by roof overhang, louvers, or other means — also acts to reduce the transmitted load by preventing solar radiation from striking the transmitting surfaces of the structure.

Thus shading, reflective surfaces, and insulation act, respectively, to prevent energy from reaching the transmitting surfaces, to reduce absorption of that energy which does reach such surfaces, and to minimize the transmission rate of such energy as may be transferred through those surfaces.

2) *Time Lag.* When inside air temperature is held constant during a rise of outside air temperature, the mean temperature of the transmitting walls, floor, and ceiling of a structure will necessarily increase. This means that steady state transmission will no longer occur. During the transient interval a substantial portion of the energy received at the outer surface of the transmitting surfaces will not be transferred to conditioning load, but instead will flow to storage within the structure. Thus, the structure acts as a thermally levelling influence, a "reservoir" of thermal energy which is increased or diminished during transient intervals.

When the outside air temperature changes rapidly, the thermal capacity of a structure will be such that rebalance of the energy storage level will provide a time interval before change of load on the conditioning equipment becomes evident. For a thermally light structure (a Quonset hut) this interval will be only a matter of minutes, for a structure of medium thermal capacity (a well insulated house) the interval will be hours, whereas for a thermally heavy structure (a Gothic cathedral) intervals of weeks are not uncommon.

Once complete data is available on patterns of change of desired inside and imposed outside conditions, and the physical characteristics of a structure have been fixed, the engineer can apply analytical methods to achieve a satisfactory approximation to the lag characteristics.

3) *Amplitude Reduction.* Just as in the case of time lag, the thermal capacity of a structure provides a kind of "thermal flywheel" which minimizes the load change indoors as compared with that which occurs outside. This effect is usually an advantageous one from the standpoint of the air conditioning engineer, since it enables him to design equipment for operation over a smaller range of loads. +

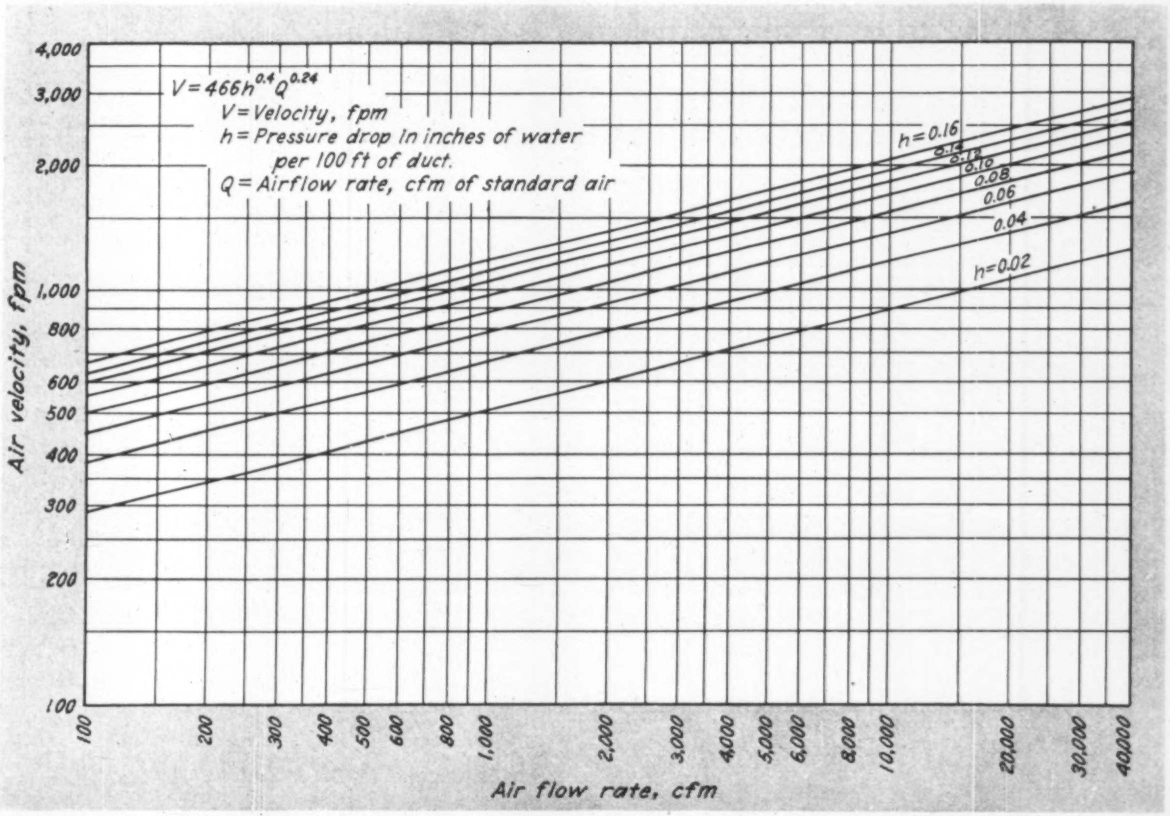
The author will discuss the next three stages of air conditioning design—evaluating the thermal load, designing the system for extreme loads, and controlling the system for all operating conditions—in an early issue.

HPAC DATA FILE

Presented on this and the following nine pages are tables, charts, and graphs containing information and data often needed in designing, installing, operating, and maintaining heating, piping, and air conditioning equipment in large buildings. Simplified in form for quick reference, this data file will serve as a valuable tool for consulting engineers, mechanical (heating, piping, and air conditioning) contractors, and plant and building engineers.

Sizing Ducts By Equal Friction Method

Application of equation shown in chart below aids in selection of pressure drop to be used in designing a duct system. From an article by Vincent J. Turecamo in the April 1956 issue of Heating, Piping & Air Conditioning.



APPLICATION OF EQUATION for determining correct pressure drop for any given system shows that velocity increases as air flow rate increases

Determining When Pump Should Be Replaced

From an article by C. E. Cromwell in the June 1954 issue of Heating, Piping & Air Conditioning.

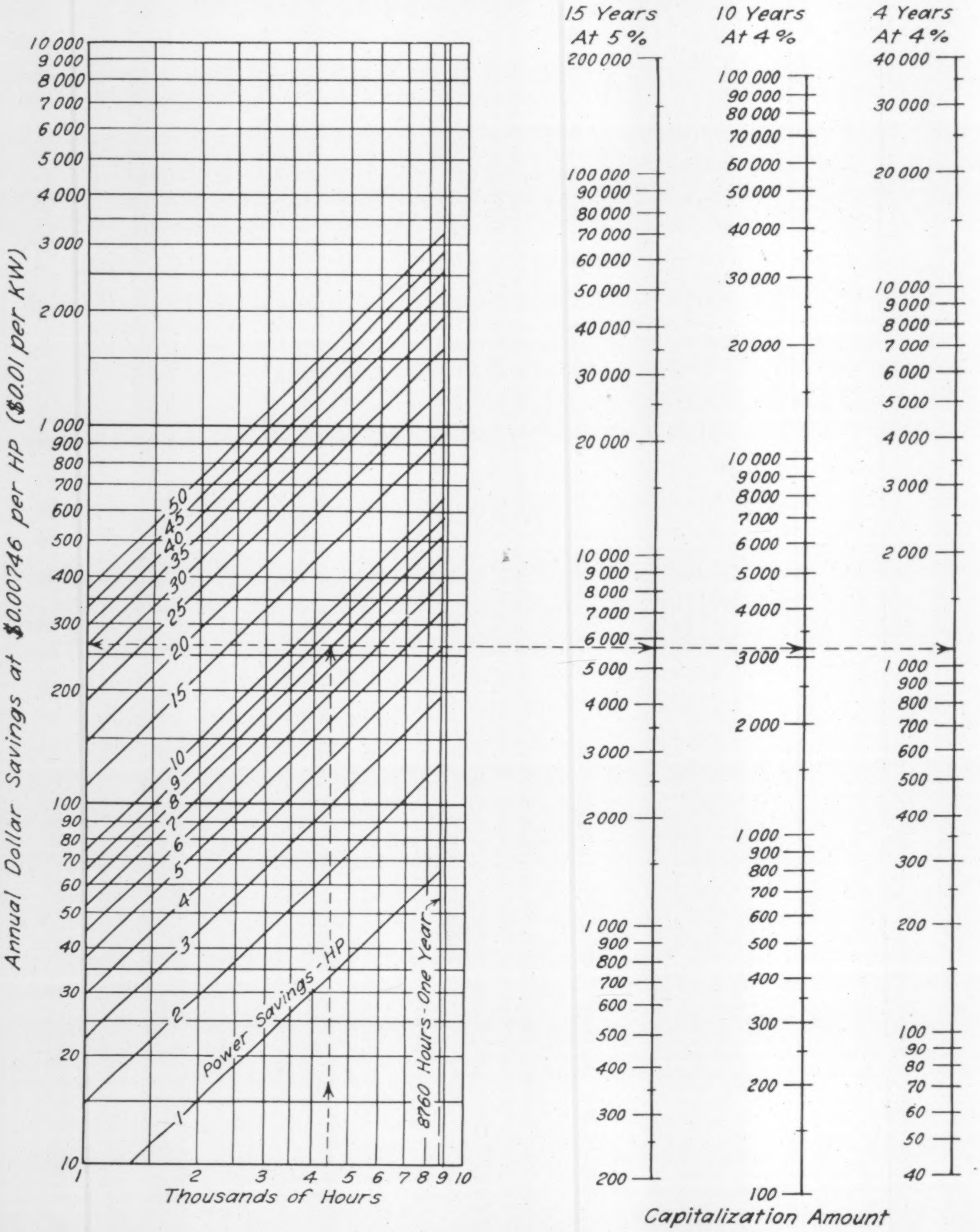


CHART IS BASED on cost of power at $0.01 per kwhr. If power cost is more or less, multiply answer from chart by ratio of cost in chart to actual cost. Chart is accurate to within 2 percent. For greater accuracy, multiply horsepower savings by yearly hours of operation by the cost per horsepower hour — kwhr cost × 0.746

Steam Flow Rates For Power Piping

From an article by Hugh Welshman, Jr. in the December 1951 issue of Heating, Piping & Air Conditioning.

CONVERSION FACTORS for flow of steam as given in Fig. 1 on pages 182 and 183

½ to 100 psi

Press. Lb Gage	Temp. at Saturation	Total Temperatures—Degrees F														
		Sat. Temp.	300°	350°	400°	450°	500°	550°	600°	650°	700°	750°	800°	850°	900°	950°	1000°
½	213.7°	1.00	.942	.912	.885	.860	.837	.817	.797	.779	.762	.746	.731	.718	.704	.692	.679
5	227.1°	1.130	1.075	1.042	1.011	.982	.956	.932	.911	.889	.869	.851	.834	.818	.803	.789	.775
10	239.4°	1.256	1.205	1.167	1.132	1.101	1.072	1.045	1.020	.997	.975	.955	.936	.919	.902	.885	.871
15	249.8°	1.369	1.323	1.282	1.244	1.209	1.176	1.148	1.120	1.095	1.071	1.048	1.027	1.008	.989	.972	.954
20	258.8°	1.473	1.425	1.378	1.336	1.298	1.261	1.229	1.200	1.171	1.144	1.120	1.097	1.076	1.056	1.036	1.019
25	266.8°	1.568	1.529	1.477	1.430	1.398	1.351	1.315	1.282	1.254	1.224	1.198	1.173	1.150	1.128	1.109	1.090
30	274.0°	1.658	1.615	1.558	1.508	1.463	1.424	1.385	1.354	1.323	1.293	1.266	1.241	1.215	1.194	1.171	1.151
35	280.6°	1.742	1.714	1.656	1.603	1.557	1.514	1.475	1.438	1.403	1.371	1.343	1.315	1.289	1.264	1.242	1.220
40	286.7°	1.823	1.797	1.735	1.680	1.629	1.583	1.541	1.503	1.467	1.434	1.403	1.378	1.348	1.323	1.299	1.276
45	292.4°	1.900	1.887	1.821	1.763	1.711	1.662	1.618	1.577	1.540	1.505	1.473	1.441	1.414	1.386	1.363	1.339
50	297.7°	1.972	1.971	1.900	1.836	1.778	1.727	1.680	1.635	1.594	1.558	1.525	1.494	1.465	1.440	1.414	1.390
60	307.3°	2.111	....	2.036	1.970	1.910	1.857	1.807	1.762	1.720	1.681	1.646	1.614	1.582	1.553	1.525	1.499
70	316.0°	2.239	....	2.175	2.105	2.035	1.978	1.925	1.879	1.832	1.792	1.752	1.717	1.683	1.651	1.621	1.593
80	323.9°	2.361	....	2.310	2.230	2.162	2.100	2.040	1.990	1.940	1.897	1.858	1.818	1.780	1.748	1.716	1.685
90	331.2°	2.477	....	2.435	2.353	2.280	2.212	2.150	2.093	2.041	1.996	1.952	1.911	1.874	1.838	1.805	1.774
100	337.9°	2.586	....	2.555	2.469	2.392	2.322	2.258	2.198	2.143	2.091	2.042	2.001	1.960	1.925	1.890	1.859

125 to 700 psi

Press. Lb Gage	Temp. at Saturation	Total Temperatures—Degrees F												
		Sat. Temp.	400°	450°	500°	550°	600°	650°	700°	750°	800°	850°	900°	950°	1000°
125	352.8°	2.842	2.710	2.633	2.565	2.495	2.435	2.370	2.312	2.266	2.220	2.174	2.132	2.092	2.052
150	365.9°	3.073	2.986	2.884	2.790	2.710	2.642	2.572	2.512	2.458	2.404	2.354	2.312	2.271	2.230
175	377.4°	3.288	3.225	3.110	3.010	2.920	2.842	2.770	2.702	2.642	2.583	2.530	2.485	2.438	2.395
200	387.8°	3.490	3.450	3.330	3.215	3.115	3.025	2.950	2.882	2.807	2.746	2.690	2.642	2.594	2.548
225	397.3°	3.682	3.675	3.530	3.410	3.300	3.206	3.120	3.045	2.978	2.913	2.856	2.799	2.747	2.697
250	406.0°	3.865	....	3.720	3.595	3.484	3.385	3.288	3.205	3.135	3.065	3.002	2.942	2.886	2.835
275	414.1°	4.037	....	3.908	3.780	3.650	3.540	3.440	3.360	3.280	3.210	3.140	3.080	3.020	2.970
300	421.7°	4.200	....	4.100	3.950	3.820	3.710	3.600	3.510	3.430	3.350	3.280	3.220	3.150	3.100
350	435.6°	4.520	....	4.460	4.290	4.140	4.000	3.890	3.790	3.690	3.600	3.530	3.460	3.400	3.340
400	448.1°	4.820	....	4.810	4.580	4.400	4.270	4.150	4.050	3.950	3.860	3.770	3.690	3.620	3.560
450	459.5°	5.110	....	....	4.910	4.710	4.550	4.410	4.300	4.190	4.100	4.010	3.920	3.840	3.780
500	470.0°	5.380	....	....	5.210	4.990	4.820	4.670	4.540	4.430	4.320	4.230	4.140	4.060	3.980
550	479.8°	5.650	....	....	5.510	5.260	5.050	4.910	4.770	4.650	4.530	4.440	4.340	4.260	4.180
600	488.8°	5.900	....	....	5.820	5.530	5.310	5.150	5.000	4.860	4.750	4.640	4.540	4.450	4.370
650	497.3°	6.150	....	....	6.120	5.790	5.560	5.380	5.220	5.070	4.950	4.840	4.730	4.640	4.550
700	505.4°	6.380	....	....	....	6.060	5.820	5.620	5.450	5.310	5.170	5.040	4.920	4.820	4.720

750 to 1500 psi

Press. Lb Gage	Temp. at Saturation	Total Temperatures—Degrees F										
		Sat. Temp.	550°	600°	650°	700°	750°	800°	850°	900°	950°	1000°
750	513.0°	6.62	6.33	6.09	5.87	5.69	5.52	5.37	5.23	5.11	5.00	4.89
800	520.3°	6.85	6.59	6.33	6.09	5.88	5.70	5.55	5.41	5.28	5.16	5.05
850	527.2°	7.08	6.86	6.55	6.29	6.07	5.89	5.72	5.57	5.44	5.32	5.22
900	533.9°	7.30	7.13	6.79	6.53	6.30	6.10	5.91	5.75	5.61	5.49	5.37
950	540.2°	7.52	7.40	7.03	6.73	6.48	6.28	6.10	5.93	5.78	5.65	5.53
1000	546.3°	7.73	...	7.20	6.87	6.61	6.40	6.22	6.07	5.93	5.79	5.67
1050	552.2°	7.95	...	7.43	7.08	6.81	6.58	6.38	6.23	6.09	5.95	5.82
1100	557.9°	8.16	...	7.66	7.27	6.96	6.73	6.55	6.39	6.24	6.10	5.96
1150	563.4°	8.37	...	7.90	7.50	7.16	6.91	6.71	6.53	6.38	6.23	6.11
1200	568.6°	8.58	...	8.15	7.66	7.30	7.08	6.87	6.69	6.53	6.38	6.25
1250	573.8°	8.79	...	8.39	7.88	7.54	7.25	7.03	6.83	6.66	6.51	6.38
1300	578.7°	8.99	...	8.65	8.15	7.73	7.44	7.19	6.99	6.82	6.65	6.52
1350	583.6°	9.19	...	8.90	8.25	7.84	7.56	7.34	7.15	6.97	6.80	6.65
1400	588.3°	9.40	...	9.17	8.44	8.04	7.73	7.50	7.28	7.11	6.94	6.79
1450	592.9°	9.60	...	9.45	8.67	8.21	7.91	7.65	7.44	7.24	7.07	6.91
1500	597.4°	9.80	...	9.75	8.94	8.41	8.07	7.80	7.58	7.39	7.21	7.04

The chart shown in Fig. 1 is based on ½ lb gage pressure saturated steam. At increased pressures and temperatures, steam pipe will carry load as indicated in chart times (X) conversion factor above, with pressure drop as indicated in chart. To simplify the use of the chart it is suggested that the steam loads in question be corrected by dividing them by the proper factor above. Then apply corrected load directly to the low pressure chart.

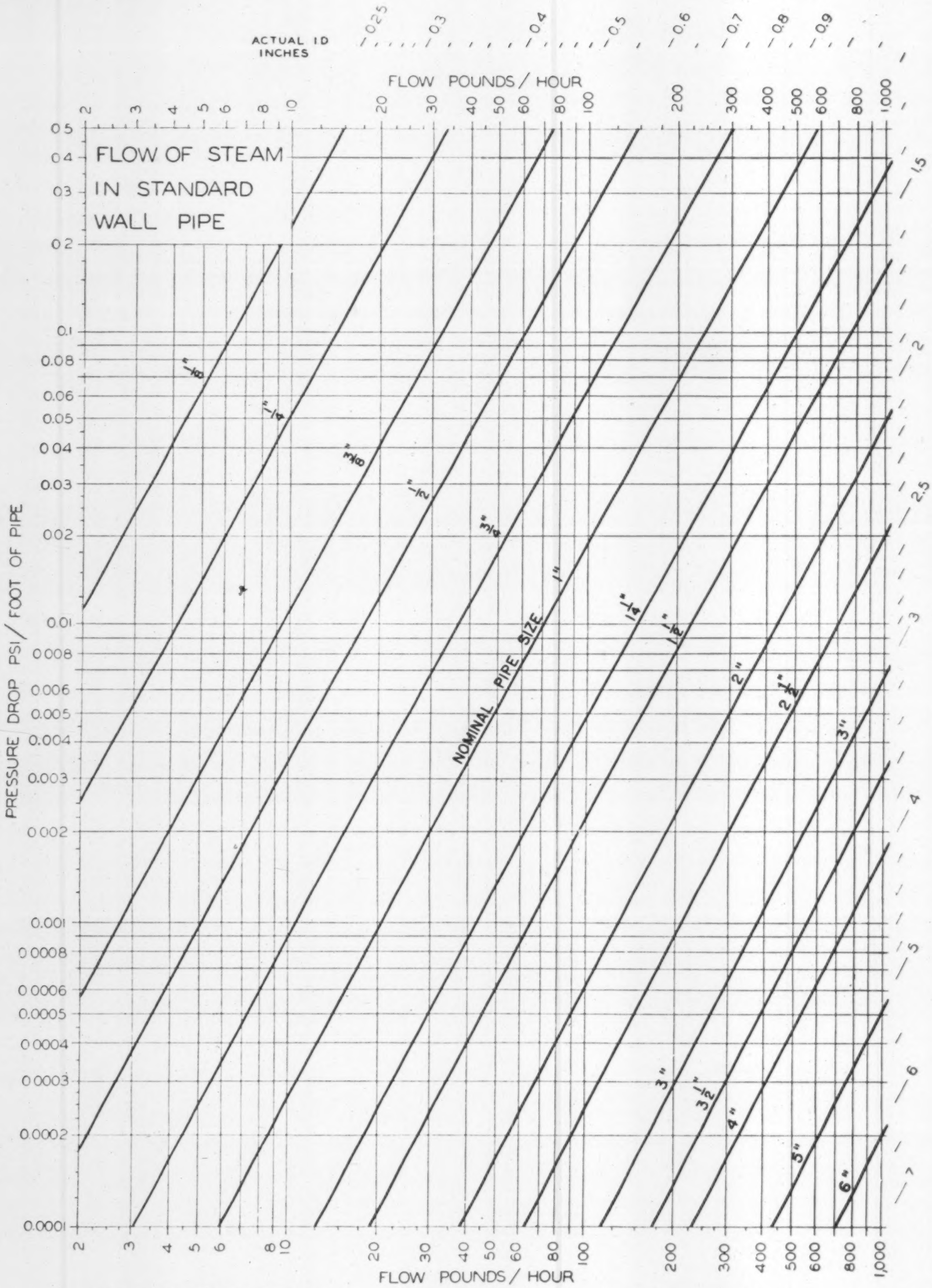
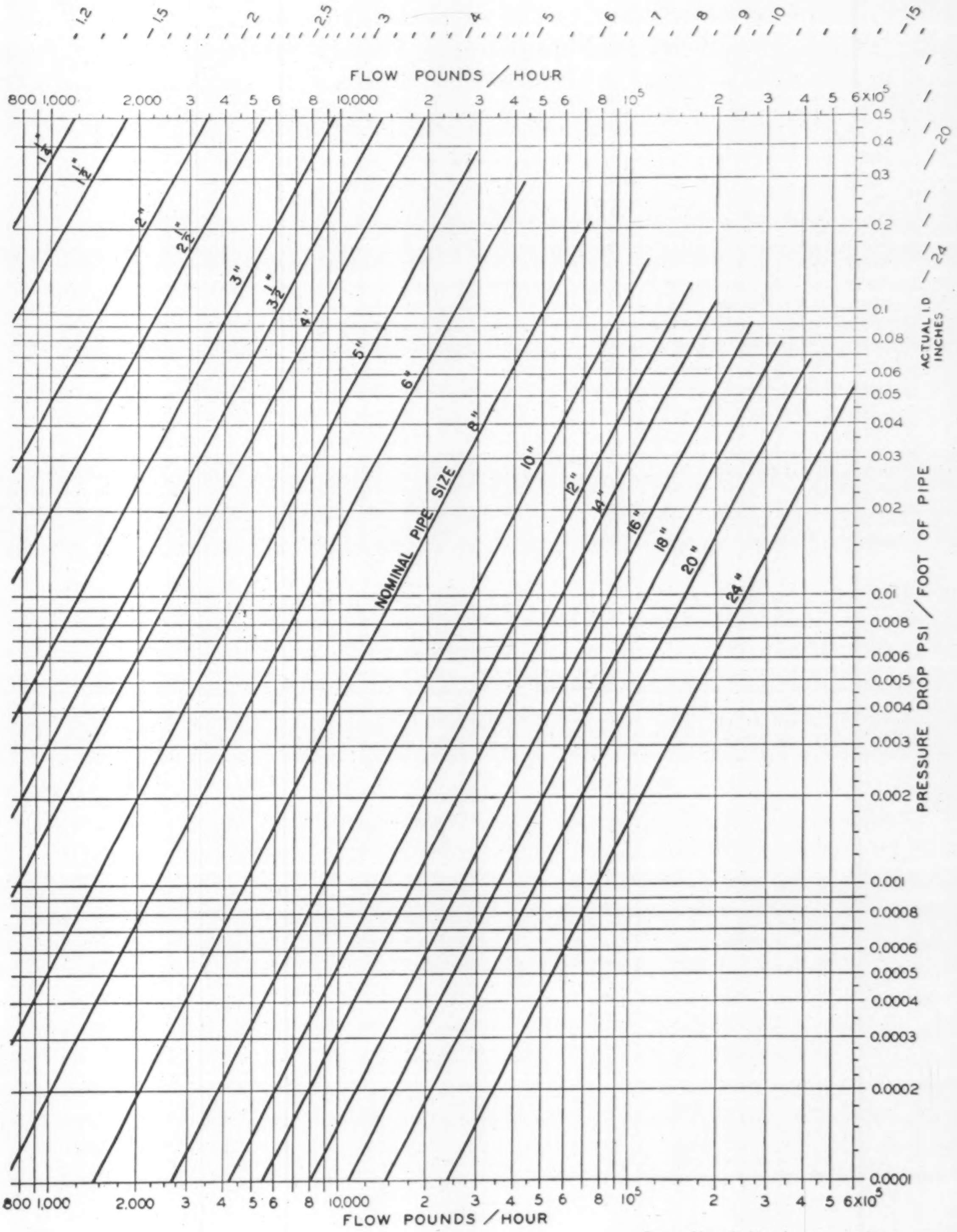


FIG. 1—FLOW OF STEAM in standard wall pipe, based on saturated steam at ½ psi gage. For given pressure drop at other pressures and temperatures, indicated flow will vary in proportion to conversion factors shown in table on page 181

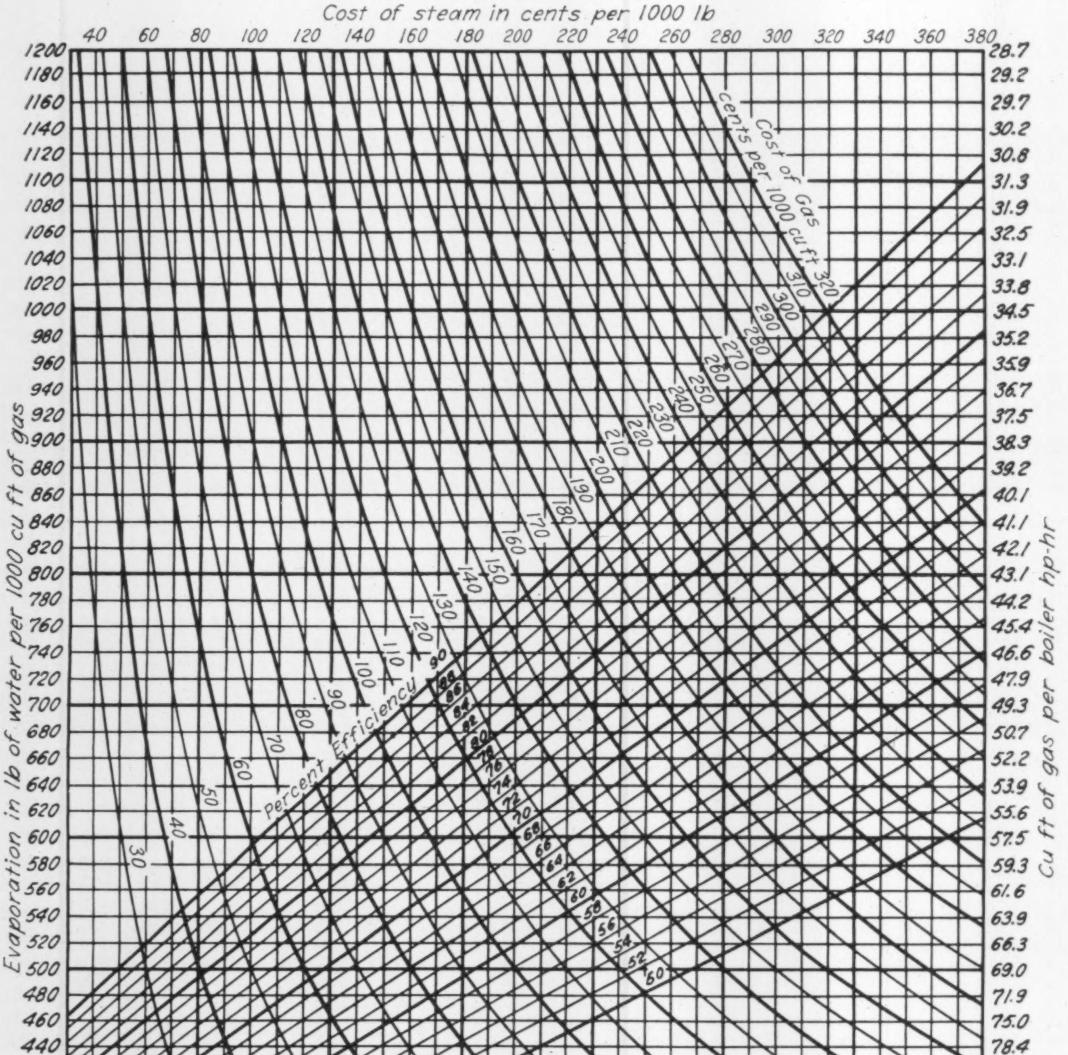


Reasonable velocities for water and steam are indicated by the following ranges:

Service water mains	2 to 5 fps
General service water piping	4 to 10 fps
Boiler feedwater piping	6 to 13 fps
Low pressure steam heating and process piping	15 to 70 fps
Low pressure steam mains	70 to 165 fps
High pressure steam mains	165 to 400 fps
Steam engine and pump piping	100 to 150 fps
Steam turbine piping	150 to 330 fps

Cost of Steam Using Gas as Fuel

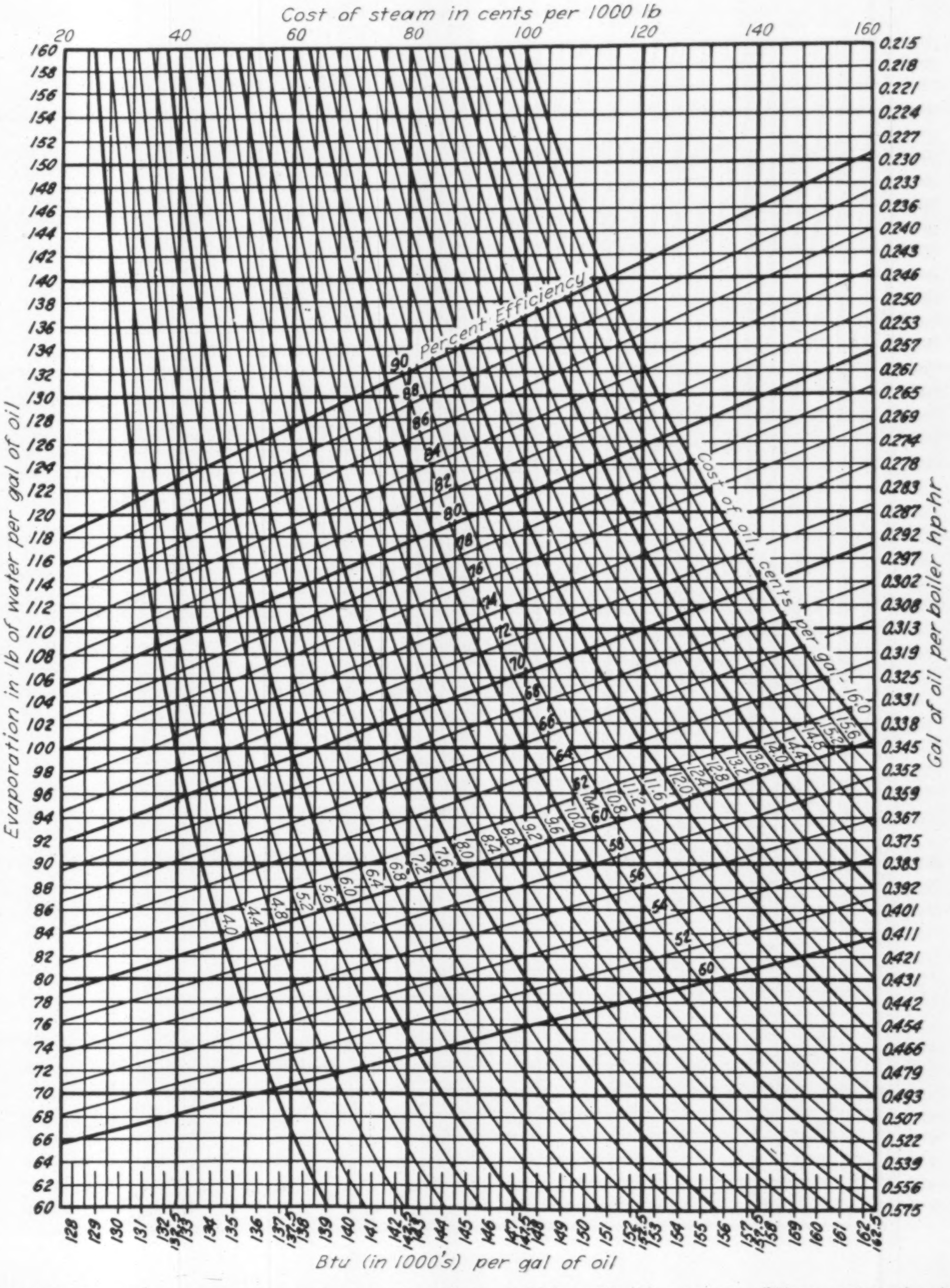
From an article by Irving E. Brooke in the November 1940 issue of Heating, Piping & Air Conditioning. Chart has been revised to bring costs up to date.



TO USE CHART, enter at proper point on bottom scale, and go vertically until either percent efficiency, evaporation in lb of water per 1000 cu ft of gas, or cu ft of gas per boiler hp-hr is intersected. Then go horizontally to right or left until proper cost curve is intersected. From this point go vertically to top and read cost of steam in cents per 1000 lb

Cost of Steam Using Oil as Fuel

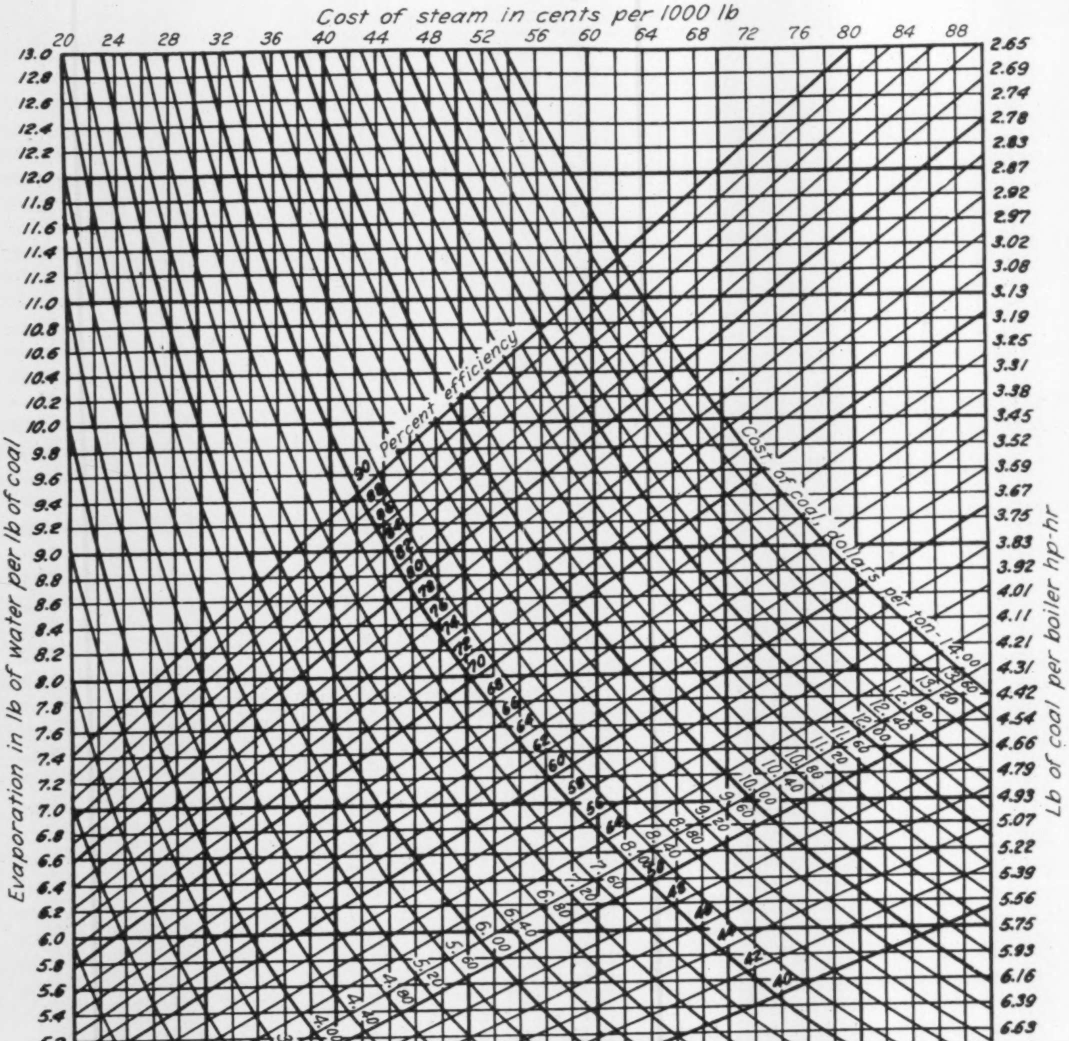
From an article by Irving E. Brooke in the October 1940 issue of Heating, Piping & Air Conditioning. Chart has been revised to bring costs up to date.



TO USE CHART, enter at proper point on bottom scale, and go vertically until either percent efficiency, evaporation in lb of water per gal of oil, or gal of oil per boiler hp-hr is intersected. Then go horizontally to right or left until proper cost curve is intersected. From this point go vertically to top and read cost of steam in cents per 1000 lb

Cost of Steam Using Coal as Fuel

From an article by Irving E. Brooke in the September 1940 issue of Heating, Piping & Air Conditioning. Chart has been revised to bring costs up to date.



TO USE CHART, enter at proper point on bottom scale and go vertically until either percent efficiency, evaporation in lb of water per lb of coal, or lb of coal per boiler hp-hr is intersected. Then go horizontally to right or left until proper cost curve is intersected. From this point go vertically to scale at top of chart and read cost of steam in cents per 1000 lb

Determining Cost of Air Conditioning

From an article in the June 1955 issue of Heating, Piping & Air Conditioning based upon information supplied by The Electrical Association and the Building Owners' and Managers' Association of Philadelphia. Harry L. Baker, Jr., associate company engineer of the Penn Mutual Life Insurance Co., developed the data in these tables.

AMORTIZATION & OPERATING COSTS FOR AIR-CONDITIONING

(In Cents/Sq. Ft./Year)

INSTALLATION COSTS DOLLARS/TON	OPERATING COSTS DOLLARS/TON/YEAR	PERIOD OF AMORTIZATION AND INTEREST RATE															
		5 YEAR PERIOD				10 YEAR PERIOD				15 YEAR PERIOD				20 YEAR PERIOD			
		3½%	4%	4½%	5%	3½%	4%	4½%	5%	3½%	4%	4½%	5%	3½%	4%	4½%	5%
600	25	63	64	65	65	39	40	40	41	31	32	32	33	27	28	28	29
	30	65	66	67	67	41	42	42	43	33	34	34	35	29	30	30	31
	35	67	68	69	69	43	44	44	45	35	36	36	37	31	32	32	33
	40	69	70	71	71	45	46	46	47	37	38	38	39	33	34	34	35
	45	71	72	73	73	47	48	48	49	39	40	40	41	35	36	36	37
	50	73	74	75	75	49	50	50	51	41	42	42	43	37	38	38	39
700	25	72	73	74	75	44	45	45	46	34	35	36	37	30	31	32	32
	30	74	75	76	77	46	47	47	48	36	37	38	39	32	33	34	34
	35	76	77	78	79	48	49	49	50	38	39	40	41	34	35	36	36
	40	78	79	80	81	50	51	51	52	40	41	42	43	36	37	38	38
	45	80	81	82	83	52	53	53	54	42	43	44	45	38	39	40	40
	50	82	83	84	85	54	55	55	56	44	45	46	47	40	41	42	42
800	25	81	82	83	84	48	49	50	51	38	39	40	41	33	34	35	36
	30	83	84	85	86	50	51	52	53	40	41	42	43	35	36	37	38
	35	85	86	87	88	52	53	54	55	42	43	44	45	37	38	39	40
	40	87	88	89	90	54	55	56	57	44	45	46	47	39	40	41	42
	45	89	90	91	92	56	57	58	59	46	47	48	49	41	42	43	44
	50	91	92	93	94	58	59	60	61	48	49	50	51	43	44	45	46
900	25	90	91	92	93	53	54	55	57	41	42	44	45	35	36	38	39
	30	92	93	94	95	55	56	57	59	43	44	46	47	37	38	40	41
	35	94	95	96	97	57	58	59	61	45	46	48	49	39	40	42	43
	40	96	97	98	99	59	60	61	63	47	48	50	51	41	42	44	45
	45	98	99	100	101	61	62	63	65	49	50	52	53	43	44	46	47
	50	100	101	102	103	63	64	65	67	51	52	54	55	45	46	48	49
1000	25	99	100	101	102	58	59	61	62	45	46	47	49	38	39	41	42
	30	101	102	103	104	60	61	63	64	47	48	49	51	40	41	43	44
	35	103	104	105	106	62	63	65	66	49	50	51	53	42	43	45	46
	40	105	106	107	108	64	65	67	68	51	52	53	55	44	45	47	48
	45	107	108	109	110	66	67	69	70	53	54	55	57	46	47	49	50
	50	109	110	111	112	68	69	71	72	55	56	57	59	48	49	51	52
1100	30	65	66	68	69	50	52	53	54	43	44	46	47	39	40	42	43
	35	67	68	70	71	52	54	55	56	45	46	48	49	41	42	44	45
	40	69	70	72	73	54	56	57	58	47	48	50	51	43	44	46	47
	45	71	72	74	75	56	58	59	60	49	50	52	53	45	46	48	49
	50	73	74	76	77	58	60	61	62	51	52	54	55	47	48	50	51
	55	75	76	78	79	60	62	63	64	53	54	56	57	49	50	52	53
1200	30	70	71	73	74	54	55	57	58	46	47	49	51	41	43	44	46
	35	72	73	75	76	56	57	59	60	48	49	51	53	43	45	46	48
	40	74	75	77	78	58	59	61	62	50	51	53	55	45	47	48	50
	45	76	77	79	80	60	61	63	64	52	53	55	57	47	49	50	52
	50	78	79	81	82	62	63	65	66	54	55	57	59	49	51	52	54
	55	80	81	83	84	64	65	67	68	56	57	59	61	51	53	54	56
1300	40	79	80	82	83	61	63	64	66	53	54	56	58	48	49	51	53
	45	81	82	84	85	63	65	66	68	55	56	58	60	50	51	53	55
	50	83	84	86	87	65	67	68	70	57	58	60	62	52	53	55	57
	55	85	86	88	89	67	69	70	72	59	60	62	64	54	55	57	59
	60	87	88	90	91	69	71	72	74	61	62	64	66	56	57	59	61
	65	89	90	92	93	71	73	74	76	63	64	66	68	58	59	61	63

AMORTIZATION AND OPERATING COSTS FOR AIR CONDITIONING (Continued)
(In Cents/Sq Ft/Year)

INSTALLATION COSTS DOLLARS/TON	OPERATING COSTS DOLLARS/TON/YEAR	PERIOD OF AMORTIZATION AND INTEREST RATE															
		10 YEAR PERIOD				15 YEAR PERIOD				20 YEAR PERIOD				25 YEAR PERIOD			
		3½%	4%	4½%	5%	3½%	4%	4½%	5%	3½%	4%	4½%	5%	3½%	4%	4½%	5%
1400	40	83	85	87	89	65	66	68	70	55	57	59	61	50	52	54	56
	45	85	87	89	91	67	68	70	72	57	59	61	63	52	54	56	58
	50	87	89	91	93	69	70	72	74	59	61	63	65	54	56	58	60
	55	89	91	93	95	71	72	74	76	61	63	65	67	56	58	60	62
	60	91	93	95	97	73	74	76	78	63	65	67	69	58	60	62	64
	65	93	95	97	99	75	76	78	80	65	67	69	71	60	62	64	66
1500	40	88	90	92	94	68	70	72	74	58	60	62	64	52	54	56	59
	45	90	92	94	96	70	72	74	76	60	62	64	66	54	56	58	61
	50	92	94	96	98	72	74	76	78	62	64	66	68	56	58	60	63
	55	94	96	98	100	74	76	78	80	64	66	68	70	58	60	62	65
	60	96	98	100	102	76	78	80	82	66	68	70	72	60	62	64	67
	65	98	100	102	104	78	80	82	84	68	70	72	74	62	64	66	69
1600	40	93	95	97	99	72	74	76	78	61	63	65	67	55	57	59	61
	45	95	97	99	101	74	76	78	80	63	65	67	69	57	59	61	63
	50	97	99	101	103	76	78	80	82	65	67	69	71	59	61	63	65
	55	99	101	103	105	78	80	82	84	67	69	71	73	61	63	65	67
	60	101	103	105	107	80	82	84	86	69	71	73	75	63	65	67	69
	65	103	105	107	109	82	84	86	88	71	73	75	77	65	67	69	71

High Temperature Hot Water

From an article by J. R. Kell in the October 1948 issue of Heating, Piping & Air Conditioning.

Table 1—Btu per hr carried by one U. S. gpm passed by pump in flow

Return temp F	Flow temperature, F							
	230	240	250	260	280	300	325	350
200	14.400	19.100	24.800	28.450	37.600	46.500	57.600	68.500
210	9.600	14.350	19.100	24.800	33.000	42.000	53.200	63.800
220	4.800	9.600	14.300	19.000	28.200	37.300	48.500	59.300
230	.....	4.800	9.550	14.300	23.580	32.700	44.000	54.800
240	.....	.....	4.780	9.520	18.800	28.200	40.250	50.400
250	.....	.....	.....	4.760	14.200	23.400	34.800	45.900
260	.....	.....	.....	.....	9.500	18.750	30.200	41.300
270	.....	.....	.....	.....	4.750	14.100	25.600	37.800
280	.....	.....	.....	.....	.....	9.400	21.000	32.200
290	.....	.....	.....	.....	.....	4.700	16.300	27.650
300	.....	.....	.....	.....	.....	.....	11.700	23.150

Compressed Air Pipe Sizing

From an article in the March 1953 issue of Heating, Piping & Air Conditioning based upon information supplied by the Compressed Air and Gas Institute.

PIPE SIZE RECOMMENDATIONS for transmission of compressed air at 80 to 125 psig

Volume of air transmitted (cfm)	Length of run (ft)				
	50-200	200-500	500-1000	1000-2500	2500-5000
	Nominal pipe diameter (in.)				
30- 60	1	1	1¼	1½	1½
60- 100	1	1¼	1¼	2	2
100- 200	1¼	1½	2	2½	2½
200- 500	2	2½	3	3½	3½
500-1000	2½	3	3½	4	4½
1000-2000	2½	4	4½	5	5
2000-4000	3½	5	6	8	8
4000-8000	6	8	8	10	10

Cut Heating Costs 68 Ways — Checklist Shows How

BY WILLIE HAMMER
Chief, Heating and Fuel Units
Engineering Div.
HQ, U. S. Army, Japan

IT HAS BEEN REPORTED that the amount of fuel used for space heating in the U. S. is more than three times the amount required to run its railroads and more than twice that required to run its airplanes, automobiles, and trucks. Possibilities of savings in heating costs are, therefore, tremendous.

The following list presents 68 tips on how to reduce heating costs. It would be an extremely inefficient organization which would benefit from all these suggestions, and a superlative one which could use none.

1) Use the type of fuel — coal, oil, or gas — which is most economical after all costs are considered.

2) Purchase fuel under the most economically advantageous conditions, i.e., during periods of a year when prices are usually lowest, and store until time of use, if possible.

3) Purchase fuel for a number of plants with one contract, rather than several individual agreements. This may sometimes result in lower prices.

4) Make certain that calorific value of fuel is in accordance with specifications.

5) Store fuel properly. Check for and try to eliminate fuel losses due to storage, transfers, spontaneous combustion, weathering, or washing out of fines in the case of coal; leakage, vaporization, or spillage in the case of oil; leakage of gas.

6) Keep moisture out of the fuel.

7) Install equipment to reduce the cost of fuel handling.

8) Place heated oil tanks underground to reduce heat loss.

9) Preheat heavy fuel oil sufficiently for good atomization, but do not overheat. Insulate heater and lines.

10) Investigate possibility of purchasing steam from utility company or neighboring plant at lower cost than it can be produced at own plant.

11) Use instruments and operating logs to maintain operations at the highest possible efficiencies. Such instruments include:

a) Gas analyzers to reduce the stack losses, and to reduce to a minimum the excess air being heated.

b) Flue gas temperature meters to indicate the possible presence of soot, scale, or ash on the heating surfaces, delayed combustion, too much excess air, leaky baffles, or improper combustion.

c) Draft gages to indicate if the correct amount of air is being supplied.

d) Steam flow meters or feedwater meters to indicate the amount of steam being generated. Water meters to determine amount of makeup being used.

e) Water temperature meters to indicate if traps are passing live steam, if condensate and exhaust steam are being utilized properly to preheat feedwater, if economizers are operating at best possible efficiency.

f) Smoke meters to indicate combustion conditions. Compute combustion efficiencies daily to be sure operation is at highest possible level.

12) Operate one or a few boilers at high load rather than many boilers at low load. Test boilers to determine range of loads for best efficiencies and try to operate within that range.

13) Boilers should be sized to permit efficient operations under varying and different loads. Where large boilers must be operated during periods of light loads at low efficiencies, investigate economic practicability of installing and using a small boiler that can be operated more efficiently.

14) Use automatic controls for as many variables as possible.

15) Where more than one boiler plant is in an area, interconnect to permit operation of a minimum number when operating at light loads.

16) Use accumulators to balance loads and to permit operations at most economical rates and times.

17) Do not start large boilers for short cold spells after the heating season has ended.

18) Eliminate air leaks into the combustion chamber.

19) Check ash content of coal fired plants to determine presence of combustible material.

20) Use steam or air jets where required for better mixing conditions, especially when flue gas analyses indicate the presence of substantial amounts of oxygen and carbon monoxide.

21) Use steam calorimeter to make certain that carryover is minimized.

22) Keep induced and forced draft fans properly adjusted and maintained.

23) Adjust coal feed for size of coal.

24) Keep oil atomizers clean.

25) Make certain that dampers and damper controls work freely.

26) Provide sufficient combustion air, but keep draft as low as possible to reduce heating of excess air. Avoid high air velocities of inlet air which might carry small

hot coals to the boiler walls and metal where it might fuse.

27) Use economizers and air preheaters to utilize heat in flue gases which might otherwise be wasted.

28) Keep heat transmission surfaces clean of scale, soot, ashes, mud, or other foreign materials.

29) In oil or gas installations with manual or semi-automatic controls, make sure that boilers are cleared of combustible gases before attempting to restart fire after a shutdown. While this is primarily a safety measure, the obvious damage that could occur requiring replacement qualifies it as a cost saving factor.

30) Eliminate excessive loss by use of continuous blowdown systems.

31) Use exhaust or flash steam from steam driven auxiliary equipment or from process work to heat feedwater or for space heating purposes.

32) Use internal or external water treatment to reduce formation of scale with its attendant loss of heat, increased cleaning costs, and increased possibility of damage to metal heating surfaces.

33) Make certain that operators are instructed in best methods to use the equipment, and that all operators and operations are supervised by competent personnel.

34) Have manufacturers' instructions available in order to be sure operations are performed in the manner for which the equipment was designed. Operate boilers at optimum conditions for which installed.

35) Insulate lines, equipment, and boilers to reduce heat loss. Use refractory linings in furnaces to reduce absorption of heat transmitted by radiation.

36) Maintain insulated lines properly to prevent wetting or damage.

37) Install heat exchangers to utilize condensate for heating cold process water for laundries before the water enters steam fed hot water generators.

38) Superheat steam for process and heating enough to reduce or eliminate condensation in mains.

39) Prepare maintenance schedules well in advance to provide time for procurement of necessary supplies and to permit optimum use of men and equipment.

40) Make certain that steam lines are drained and trapped properly.

41) Make certain that steam lines passing over or under obstructions are not air bound.

42) Maintain valves properly to permit radiators, convectors, or other heating units to be shut off.

43) Remove excessive radiation to eliminate overheating of occupied spaces.

44) Use thermostatic controls for heated spaces. Use zone controls in large buildings or for areas requiring different temperatures. Control temperature of the hot water supply to make certain it is not higher than required. Check controls to be sure that they operate correctly and within set limits.

45) Eliminate or reduce heat in spaces where it is not essential for the comfort of personnel, or for the protection of equipment, or for stored supplies. Block off heated areas from those unheated. Use hoods, booths, false ceilings, or small structures within large ones to hold heat where desired.

46) Make certain that bypass lines around traps are not used unless required. If necessary, remove valve handle, lock valve, or remove bypass.

47) Reduce line losses by use of gate valves wherever possible and by eliminating extra fittings and bends in lines.

48) Remove air from radiators, lines, and heaters to eliminate its insulating effect and to improve the heat transfer rate.

49) Make certain that lines are tight in vacuum condensate return systems. Be sure the vacuum pump is operating properly.

50) Keep large heating systems balanced with orifices, valves, or dampers.

51) With warm air systems, make certain that warm air outlets and return air intakes are not obstructed.

52) Insulate warm air ducts in unheated spaces.

53) Eliminate use of live steam by direct injection in process equipment, and return maximum amount of condensate to the boiler.

54) Provide publicity on need for conservation of heat by publishing notices in bulletins, company newsletters, by use of posters, etc.

55) Use a monitor system to be sure that heat and fuel are not wasted.

56) Initiate fuel targets based on past usage, building heat loss, degree days, or other methods, and try to stay within those targets.

57) Reduce temperature at night and during weekends and holidays.

58) Insulate walls, floors, and roofs adequately.

59) Use insulating glass, double glazing, and storm sash to reduce heat loss through windows and doors.

60) Make certain that windows and doors are well fitted, frames caulked, and weatherstripping installed.

61) Eliminate excess ventilation to and from heated spaces.

62) Use instrumentation and recorders to provide information on use of steam and hot water by departments.

63) Provide insulation and covers on open storage tanks containing heated liquids, to reduce heat loss.

64) Install maximum and minimum thermometers in heated areas to indicate to occupants what temperatures are and have been. Mark thermometers with desirable temperature range.

65) Use revolving doors or provide vestibules to reduce heat loss from entrances in cold weather.

66) Close openings to unheated stairwells and elevator shafts.

67) Use cost records to determine areas of high heating costs where savings might be effected.

68) Encourage participation of all personnel in developing and suggesting more efficient, effective, and economical methods of accomplishing savings. ⌿

The author is also compiling a list of ways to cut cooling costs. This will be published in an early issue.

Protection Saddles Prove Important Piping Addition

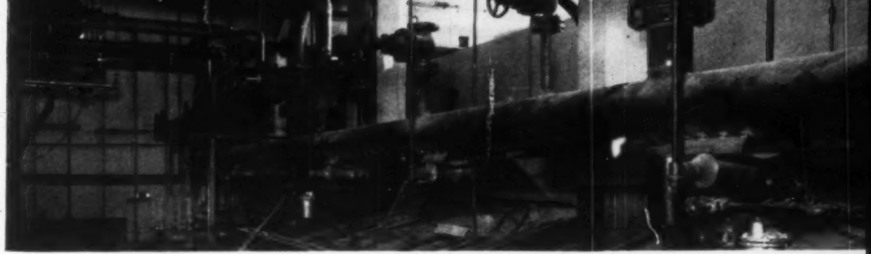


Fig. 1

BY G. W. HAUCK
Manager, Engineering Sales
Crane Co.

PIPING ACCESSORIES should not be overlooked when arranging for the suspension or the support of piping.

For most piping work, good design employs a combination of suspension from above and support from below, each being applied where it is the more effective and practical solution. The next consideration is that piping which is subjected to temperature is also subject to movement caused by thermal expansion and contraction or other causes. In order to permit free movement, hangers or supports fitted with rollers are commonly used. This situation is the basis for the discussion which follows and pertains to a useful piping arrangement that is neglected much too often.

One can, of course, set the pipe directly on the rollers, then apply the insulation on both sides up to the point of contact with the rollers. The trouble is that with movement of the pipe some of the insulation on either side of the roller will be crushed. There is, therefore, an area of bare pipe which results in a constant heat loss. Pipe covering protection saddles solve this problem effectively whenever piping rests on the rollers of hangers or of supports.

The ASA Code for Pressure Piping deals with this subject in Paragraph 609, which reads, in part:

"When pipe is covered by insulation, a suitable metal shield properly constructed and secured to the covered pipe should be used to protect the covering at points where the pipe is supported on movable rolling supports . . ."

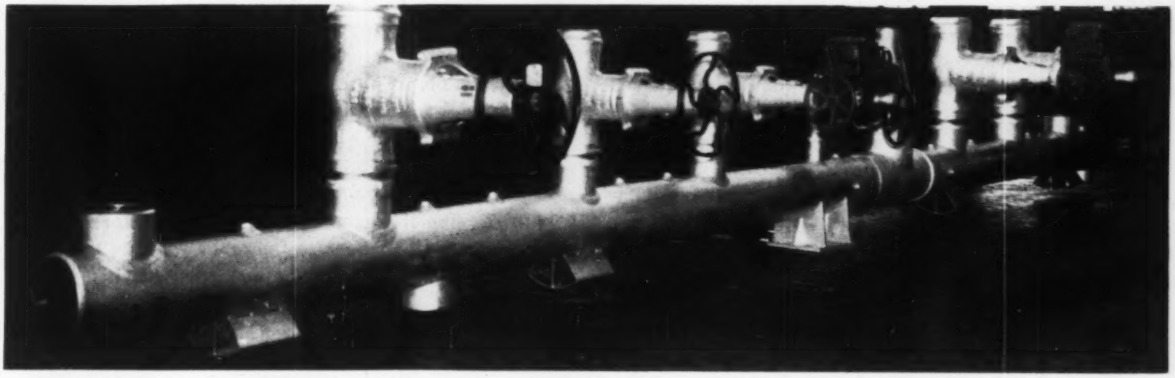
The carbon steel steam header shown in Fig. 1 is suspended from the structure above and rests on pipe roll hangers. The lugs of the saddles have been welded to the header, thus insuring that the saddles will move with the piping during expansion and contraction. No matter what movement takes place, the pipe covering will not be damaged.

In Fig. 2 four protection saddles are tackwelded to the bottom of a 12 in. Schedule 160 header made of 1 percent chrome, ½ percent moly pipe. Including the protection saddles as an integral part of the header represents good planning. The header proper had to be stress relieved in a furnace, and at the same time the tackwelds were given their stress relief treatment.

Because pipe covering protection saddles, though relatively small in size, do a big job effectively, they are worthwhile piping additions. ╪

The author is a member of Heating, Piping & Air Conditioning's board of consulting and contributing editors and has prepared numerous articles for publication on its pages.

Other articles on piping hookups will be published in the future. Previous articles were in the September through December 1957 issues.



2 **FOUR PROTECTION SADDLES** welded to the bottom of this 12 in., Schedule 160 steam header exhibit good piping design

What to Consider When Selecting

BY HARRY GRIESE, JR.
The Trane Co.

THE COMPRESSOR is a major consideration when selecting the air conditioning equipment for a big building.

Many air conditioning applications are served by reciprocating machines, often several of them in parallel. The reciprocating machine is far from being replaced by the centrifugal. Rather, both the reciprocating and centrifugal compressors now have more clearly defined individual areas where each performs best. For the most part they complement each other instead of competing.

When a centrifugal compressor is indicated, there are many considerations which may influence selection of a specific unit. Some of the more important ones include:

1) Adequate operating and safety controls.
2) Hermetic vs open type design.
3) Capacity control.
4) Automatic operation.
5) Noise and vibration.
6) Lubrication system.
7) Operating costs.
8) Maintenance.

Assure Adequate Operating Controls

A compressor should have operating controls which respond to changing cooling loads and balance its capacity with the cooling demand of the building at any given time.

One of these controls is the chilled water thermostat. In a pneumatic control system, this thermostat normally operates from the main air pressure line and transmits air in proportion to leaving chilled water temperature to other devices which in turn regulate the capacity control mechanism.

The second important operating control is the on-off control switch which starts the compressor when cooling is needed and stops it when cooling is no longer required. On an automatic machine, the on-off control switch is usually set to close its contacts when the chilled water thermostat air pressure rises to a certain pressure and to open them when the pressure drops to a preset minimum. It is desirable that this pressure differential be such that compressor cycling on loads below minimum operating capacity be minimized, yet permit the compressor to take complete advantage of the natural flywheel effect of all the water in the chilled water circuit.

The third principal operating control, the variable capacity control, should allow automatic capacity variation over a wide range of loads. This control will be discussed further a bit later.

Six Safety Controls Vital

In addition to the operating controls, there are approximately six safety controls which are vital to the protection of the compressor. Probably the most important of these is the load limit control. This control should prevent the compressor motor from ever operating above its maximum load rating. It must be rugged and fail safe. With the exception of perhaps a solenoid coil, the entire mechanism should be pneumatic and mechanical. There should be no electrical contacts to arc, chatter, or wear. Because this control automatically prevents the motor from ever drawing more than the maximum operating current, it permits completely unattended operation of the compressor, even on startup with warm gas.

Other safety controls include:

1) A differential oil pressure cutout is needed to stop the centrifugal compressor motor should the net oil pressure drop below a preset minimum. It also should prevent the compressor from starting up until there is assurance of sufficient oil pressure in the bearings.

2) A high condensing pressure cutout is required to stop the water chilling unit in the event condensing pressure becomes too high.

3) A low refrigerant temperature cutout should be included to stop the motor before the evaporator temperature becomes low enough to freeze the water in the tubes.

4) A high motor temperature cutout is vital for the protection of water cooled motors. It should stop the compressor if for any reason the motor should start to overheat. This control will safeguard against the failure of water supply to the motor jacket.

a Centrifugal Refrigeration Compressor

5) An oil temperature controller is desirable to provide heating or cooling for the oil as necessary to maintain an optimum oil temperature. This control, however, does not have to stop the compressor.

Hermetic vs Open Type Design

The basic design of the compressor — whether hermetic or open — should certainly be considered by the consulting engineer. Hermetic design provides several tremendous advantages. The first of these is the entire elimination of shaft seals. Shaft seals are generally considered to be a continual nuisance since they provide a weak point where dirt and moisture can enter the compressor and valuable refrigerant may leak out. Shaft seals require more maintenance than any other component of the centrifugal compressor.

Another advantage, as long as cooling is provided, is that the motor is able to operate in a dirt free, controlled atmosphere which actually reduces motor maintenance and greatly lengthens its life expectancy. Water or gas cooled hermetic motors have efficiencies equal to or greater than air cooled motors.

Investigate Capacity Control

Since air conditioning systems normally operate at constantly changing loads, it is important to thoroughly investigate methods of capacity control for the centrifugals being considered.

Automatic adjustment over a wide range of loads is essential because all equipment with large motors must be kept on the power line as much as possible to prevent frequent starting and stopping. Frequent starting will result in:

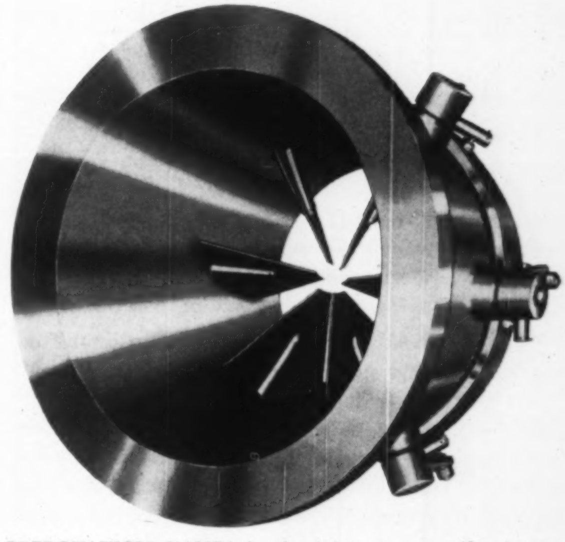
1) Increased wear and maintenance of refrigeration equipment.

2) Overheating the motor which will shorten its life span.

3) Excessive wear on motor starters which are designed for a limited number of starts per hour.

4) Higher overall noise level than that experienced during constant operation.

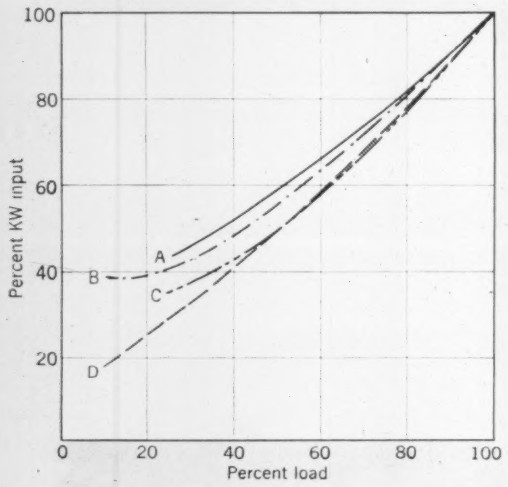
The various methods used for capacity modulation of centrifugal compressors are the following:



PREROTATION VANES in the inlet to a centrifugal compressor are one means of providing good capacity control

Suction damper. The suction damper is a butterfly valve in the suction line between the evaporator and the compressor. This damper serves to break up the flow of gas into the compressor by creating a resistance. The arrangement is inefficient, but it is relatively inexpensive and does provide a means of control with a slight improvement in the stable operating range. Unfortunately, this method usually does not permit the compressor to operate at much less than perhaps 30 to 45 percent of full capacity, depending on the characteristic of the impeller when compared to the full refrigeration load of the system.

Hot gas bypass. To enable a compressor to modulate down to 25 percent of full load and possibly even to 10 percent of full load, a hot gas bypass is sometimes used. This hot gas bypass can also be arranged for automatic operation. The disadvantage of this method of capacity control is its extra cost with no reduction of input to the compressor below the kw input at which the bypass is opened. As a result, when the load drops to the point at which the hot gas bypass must operate to keep the compressor on the line, the owner does not realize a saving in the amount of power consumed by the centrifugal refrigeration system.



POWER INPUT for four types of centrifugal compressors shown here. Load variations range from about 20 to 100 percent

Speed variation. Another method used to control capacity is to change speed through the use of wound rotor motors or fluid couplings. Reducing the speed of a compressor reduces both its head and capacity. At any given speed, the head developed by the compressor increases as the load decreases. It is also true that at reduced load less head is needed because suction pressure is up while the condensing pressure is down. Since there is excess head, the speed can be reduced. This method is highly efficient as far as the compressor is concerned, but does not provide much improvement in capacity range.

Its principal disadvantage is that the reduced capacity range is limited by the loss of compressor head at reduced speed. Another disadvantage is that with motor drive the efficiency of the speed reducing equipment is low, affecting the apparent advantage in good compressor efficiency at partial load.

Prerotation guide vanes. Another method involves the use of guide or prerotation vanes before the impeller. These vanes spin the gas in the direction of impeller rotation, enabling the impeller to pick up the refrigerant with less turbulence loss. This also keeps the compressor on the line at lower capacity levels. With the use of prerotation vanes in a multistage compressor, a 20 percent capacity modulation may be expected if used before one stage and 10 percent if before both stages.

Usually the control of the prerotation vanes is automatic. Prerotation vanes before both stages of a two stage compressor permit an infinite number of steps in the range of 10 to 100 percent capacity.

Avoid Operating Noise and Vibration

When comparing centrifugal against centrifugal for noise and vibration tendencies, it is almost always true that the one with the fewest rotating and moving parts will produce the least noise and vibration.

It is therefore important to take particular care to select a compressor which will not prove annoying to the occupants of a building. It is easy to appreciate the importance of low noise and vibration when one considers the many locations in a building, other than the basement, in which compressors are placed. Roofs and intermediate floors are common locations for such equipment in existing buildings where no basement space is available.

All compressors should be investigated for any design characteristics which might produce objectionable noise. For instance, comparisons might be made on the number of bearings, the number of moving parts, and whether they employ gear boxes which may produce a high pitched whine. Also, where field alignment of rotating equipment is necessary, vibration can result.

Assure Preliminary Bearing Lubrication

When dealing with high rpm such as are used in centrifugal compressors, the design and operation of the lubrication system is extremely important. Bearing specialists agree that 90 percent of bearing wear occurs during the accelerating period when lubrication is inadequate. It is therefore important that the compressor have adequate lubrication not only during operation, but before startup.

There are several methods of providing preliminary lubrication to the compressor bearings. These are:

1) An oil pump arrangement whereby the driving power is provided by the compressor shaft. With this type of lubrication system, the compressor must be operating before the oil pump starts. The only lubrication during the initial startup is that which is made possible by oil rings provided with each shaft bearing.

2) An arrangement which utilizes a shaft operated gear pump and hand operated auxiliary pump. The auxiliary pump is used to provide lubrication to the bearings before the startup. This means that operation cannot be entirely unattended.

3) A system whereby there are two oil pumps. One of these is motor driven and the second, driven from the compressor shaft. The motor driven pump is started prior to the compressor startup. The auxiliary motor driven pump continues to operate until the delivery pressure from the shaft pump is greater.

4) A lubrication system wherein controls are interlocked so that the separate motor driven oil pump must start, operate, and provide a predetermined oil pressure before the compressor starts. This system permits safe, automatic operation.

Regardless of the method of lubrication used, any failure of the oil pressure must shut down the unit. The lubrication system should also provide enough oil in its oil lines to enable the compressor to coast safely to a stop should an oil pressure failure take place.

Each manufacturer of centrifugals will specify an oil which has been tested for his particular bearing design. These oils have an optimum temperature range for best lubricating properties. The lubrication system for any centrifugal refrigeration system should have a provision for both heating and cooling the oil in the oil sump. Heating is required to drive the refrigerant gas from the oil at shutdown, and cooling to take the heat of friction from the bearings. This friction horsepower varies from 1 to 4 percent, depending upon the design and number of compressor bearings. The greater the number of bearings, the greater the friction horsepower will be. This, in turn, will determine the extent of oil cooling required.

All manufacturers of centrifugal compressors furnish oil cooling coils and heaters for their respective lubrication systems. Each has his own method of controlling the oil temperature which provides uniform viscosity and minimizes power requirements.

Analyze Operating Costs Carefully

One of the engineer's most important considerations is that of cost. A compressor selected for peak efficiency at full load, but with poor part load performance, may provide some saving in first cost, but operating expenses over the years may more than offset the slightly lower original cost.

For quick estimating, it can be assumed that annual operating costs for the average air conditioning system will be about 7 percent of the initial cost, excluding building alterations. With higher priced systems, this would probably drop to 5 percent, and with low cost systems, it might run as high as 10 percent.

Operating costs can be subdivided into three parts. These are:

1) Energy and water cost.
2) Labor for operation.
3) Maintenance cost.

A simplified method of determining operating power cost for cooling is presented in the following formula where the power rate is dollars per kilowatt-hour, and the factor, F, takes into account kilowatts per brake horsepower, horsepower per ton, average loading conditions, compressor efficiency, and motor efficiency. F will be equal to 1 in the average refrigeration system.

$$\text{Seasonal power cost} = \text{full load tons} \times \text{hours} \times \text{power rate} \times F$$

The formula includes the horsepower of the fans, chilled water pumps, and water saving devices.

Condenser water cost estimates can be based on equivalent full load operating hours also by use of the following formula:

$$\text{Seasonal water cost} = 0.09 \times \text{full load tons} \times \text{hours} \times \text{water cost, dollars per 1000 gal}$$

The factor 0.09 is a conversion factor to give like units in the formula and is based on 1.5 gpm of condenser water per ton. If a cooling tower is used, 5 percent of the formula cost would be a conservative estimate.

Labor for operating air conditioning equipment will vary, depending on the size of the job and completeness of the automatic controls. On larger systems, an operator is generally required, and this cost must be included in the cost analysis.

Maintenance charges consist of labor and material expense necessary to make repairs and replace parts. Routine maintenance such as cleaning, painting, and inspecting will be handled by the operating or maintenance group. Their time will have to be figured accordingly.

Certainly, power cost is the largest single item, and in order to obtain an approximate estimate of the difference in power costs between three different centrifugals, identically sized systems are assumed to be operating at 1500 hr per season. It can also be assumed that each system operates at full load 15 percent of the time, at 75 percent of full load 35 percent of the time, at 50 percent of full load 35 percent of the time and at 25 percent of full load 15 percent of the 1500 hr.

In order to provide a means for operating cost comparison, we will assume that all other conditions are identical, and that the maximum capacity of the machines is equal to the maximum design load of the system. Two of the compressors averaged 65.7 percent and 73 percent of full load kw input, the former with a wound rotor motor and the latter with a constant speed motor drive. The hermetic inlet vane control compressor averaged 62.9 percent of full load kw input.

Now, using a full load input of 250 kw in the case of each of three compressors, the operating costs for 1500 hr at $0.02 per kwhr rate would be $5470 for the open type compressor with the constant speed motor drive; $4930 for the open type compressor utilizing a wound rotor motor; and $4720 for the hermetic centrifugal compressor. The hermetic operating costs for a year would be $750 or 13.7 percent below the constant speed motor driven unit and $210 or 4.2 percent below that with the wound rotor motor.

Parts Should Be Accessible, Replaceable

All mechanical equipment requires occasional maintenance in one form or another. The centrifugal refrigeration compressor is no exception to the rule.

The most vulnerable parts of centrifugal compressors requiring maintenance are the purge unit, shaft seals, and the gear, compressor, and motor bearings. It is important to select a centrifugal with parts that are easily accessible and replaceable. Shutdowns are at best uncomfortable and, in process work, can be very expensive.

Purge compressors do need new parts. Shaft seals wear and fail, as do improperly lubricated bearings. Obviously, the fewer moving parts and other areas where maintenance may be required, the less time and money will be required for maintenance of the centrifugal refrigeration system. Certainly the maintenance records of the various centrifugals should be carefully investigated. ⌗

Vacuum Pump Would Have Prevented Costly Troubles of Heating System

As an advocate of the vacuum pump, the author relates how the use of one would have solved a heating system's "breathing" problem.

A BEAUTIFUL memorial theater in Michigan is heated by high pressure steam from a public utility plant, but the steam was expected to circulate at atmospheric pressure.

There are five separate steam supply circuits in this building, each with a separate pressure reducing valve. The heat transmitters are cast iron radiators, thermally circulating enclosed convectors, and finned copper blast convectors.

The ends of all supply mains have thermostatic traps. The five separate return systems join a header near the condensation meter. There are no float traps on the ends of the return mains, but all are overhead, and the header is open to the atmosphere through a 1½ in. standpipe.

Every heat transmitter in the place has an automatic temperature control valve. It is, of course, impossible to adjust the five reducing valves so that a uniform pressure is maintained by all of them, and the constant opening and closing of the five reducing valves, changing the steam demand, continued to upset any attempt to maintain a uniform pressure in relation to atmospheric pressure.

I found the open vent intermittently discharging vapor and air, then sucking it in, in a constant breathing in and out, and I found that the pressure in some of the returns was subatmospheric at the same time others were at pressures above atmospheric.

Steam at 60 psig is about 306 F temperature. When reduced to 2 psig, this steam will be superheated nearly 100 F.

I found a history of constant replacement of both steam and return pipes. The utility company that furnished the steam had paid for some of the replacement and had spent large sums of money seeking to correct the chemistry of the feedwater and recording the steam and the condensate — all to no conclusion.

Single pipe steam heating systems in adjacent buildings using utility company steam having ordinary air valves and float traps at the ends of the mains gave no trouble from corrosion.

Each of the five separate circuits should have been provided with a float trap at the end of the respective return pipe; and with a nonreturn air vent on each. In that case, air under high temperature in the presence of condensate would have been kept from backing into the pipes.

Had there been a vacuum pump on the job, the re-entry of large quantities of outside air into the pipes would have been prevented. I am still prejudiced in favor of vacuum pumps. ⧺

SAMUEL R. LEWIS, *consulting mechanical engineer and a member of HPAC's board of consulting and contributing editors, comments informally each month on practical heating, piping, and air conditioning problems.*

Tear out along this line

How to Space Supports for Steel Pipe

BY GEORGE METRY
Consulting Engineer

When a horizontal steel pipe line is supported at intermediate points, sagging of the pipe may occur between supports. The amount of sag depends upon the weight of the pipe and its conveyed fluid, plus any insulation, valves, or fittings in the line.

If the pipe is installed with no downward pitch, pockets may form in each span. In lines conveying steam, condensate may collect there. To eliminate such pockets the lines should be pitched downward so that the outlet of each span is lower than the maximum sag.

Tests have been conducted to determine the deflection of ¾ to 4 in. size horizontal standard pipe lines filled with water.

The results indicate that, for pipe larger than 2 in. with supports having center to center dimensions greater than 10 ft, the resultant deflection is less than that determined by the use of the equation for a uniformly loaded pipe fixed at both ends.

For pipes smaller than 2 in., the test deflection is in excess of that determined by the equation for a pipe having fixed ends. For the shorter spans, it approaches the deflection as determined by the use of the equation for pipe lines having unrestrained ends.

The chart on the next page gives these values of deflection for varying spans of horizontal pipe line filled with water. It is based upon results obtained from tests for pipes 2 in. and smaller, and upon the equation for fixed ends for larger pipe. The deflection values given are twice those obtained from tests or calculations.

The equation that follows indicates the vertical distance that the span must be pitched so that the outlet end is lower than the maximum sag:

$$h = 144\ S^2y/36\ (S^2 - y^2)$$

where:

h = difference in elevation of span, in.
S = length of one span, ft
y = deflection of one span, in.

By eliminating the inconsequential term $(-y^2)$ from the denominator, this reduces to:

$$h = 4y$$

The pitch of pipe spans, called the average gradients, is a ratio between the drop in elevation and the length of the span. This is expressed as so many inches in a certain number of feet:

$$\text{Average gradient} = 4y/S$$

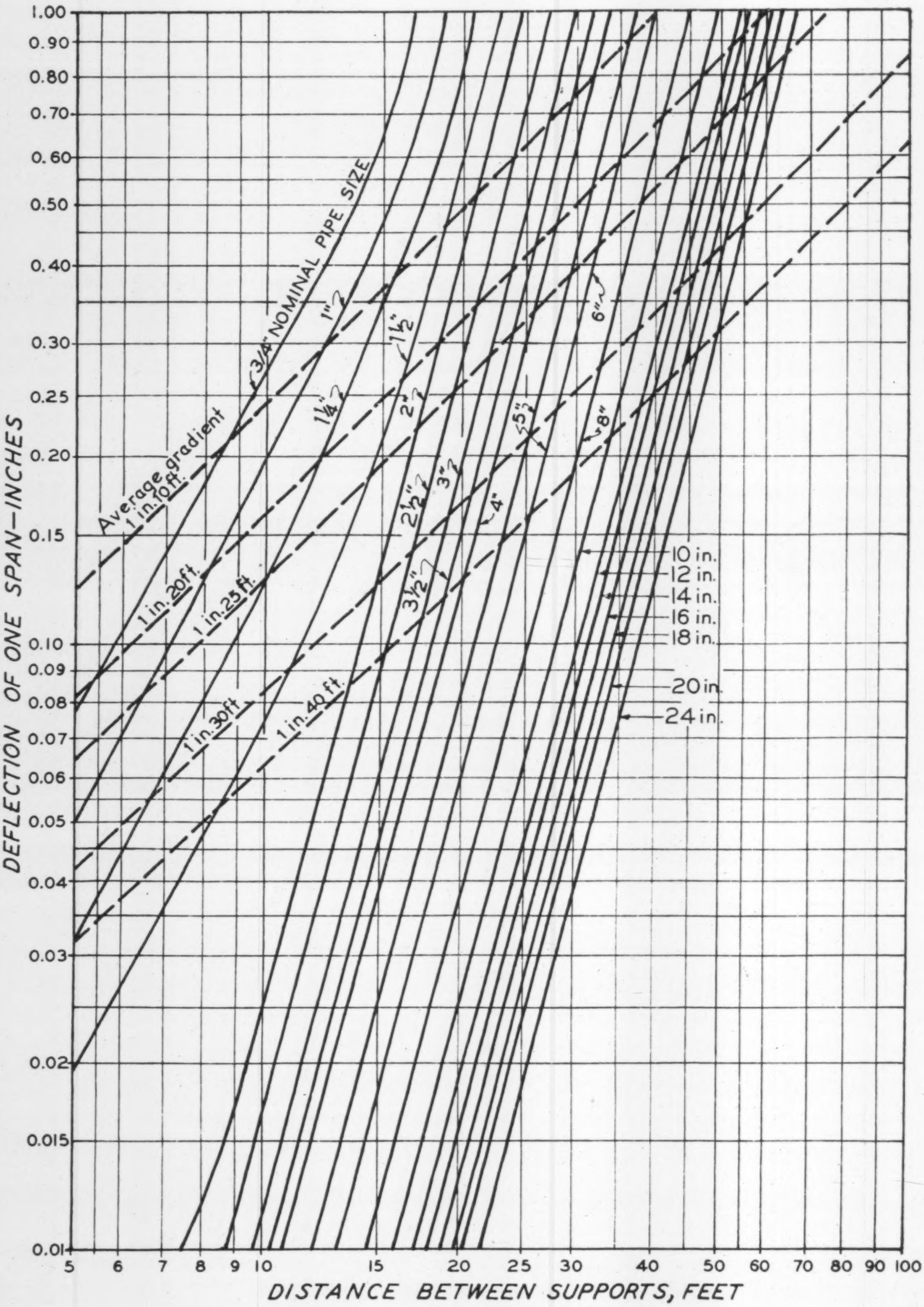
Dotted lines shown on the chart are plotted from the above equation and indicate average gradients.

Typical Problem

What is the maximum permissible distance between the supports for a 4 in. standard pipe line, assuming a desired pitch or average gradient of 1 in. in 30 ft?

Solution

Proceed downward from the intersection of the diagonal (dashed) line for an average gradient of 1 in. in 30 ft and the diagonal (solid) line for 4 in. pipe. At the chart's base it is noted that the maximum span is 22 ft. ⌗



VALUES OF DEFLECTION for varying spans of ¾ to 24 in. horizontal steel pipe filled with water can be obtained using this chart. Instructions on preceding page

Heating, Piping & Air Conditioning

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Information on other Society personnel can be found on page 238.

The Journal's New Dress

With this issue, the Journal makes its first appearance in its new dress. This is the result of plans which have been under consideration for a long time. It is felt that presenting the Journal on tinted paper stock, together with a colored ink and some revisions in typography, offers a more pleasing format. It is also hoped that in this dress, the Journal will be generally more attractive and at the same time be more useful.

In making these changes, sight has not been lost of the point that putting an old body into a new dress is not necessarily a wholly desirable procedure. Attention should be given to the body as well as to the dress. That is to say that the Journal's contents are after all of as great, or even greater, importance than its appearance.

When the Journal was established in 1915, the purpose and intent of publishing it was to make it the principal printed means of communication between the Society organization and the membership at large. This continues to be its principal objective.

With the membership growth of the Society and with the increase in its research programs and in its scope of interest, finding sufficient space in the Journal to carry the full Society message to the membership becomes an increasingly difficult problem, as more and more of the available space is needed to present the technical papers and reports whose numbers and extent increase from year to year.

Thus, putting the Journal into its new dress does not mean that there are still no problems to be solved. Methods of improving and modernizing the content, and presenting that content in more interesting and appealing ways are under constant study and consideration.

This subject of improving the Journal's content, its methods of presentation, and of making highly technical material readable and interesting is one which calls for persistence. It is more like finding and then sticking to a diet than like putting on a new dress.

Only from time to time are the results of these studies ready for introduction into the Journal content and make-up. All such changes and improvements lead along the road of keeping the Journal of the greatest possible usefulness to the entire membership.

The new dress can be considered as an important step along that road.

P. B. Gordon

Local Climatic Weather Data

By W. L. Holladay,* Los Angeles, Calif.

SUMMARY—Existing information concerning design temperatures for many southern California cities leaves much to be desired. Recognizing the problem, in 1957, the Research Committee of the Southern California Chapter of ASHAE appointed a Task Force on Outside Design Temperatures. The object was for the Task Force to develop and publish Recommended Design Temperatures for as many local communities as possible. This paper describes the methods and summarizes the results of that project. It is interesting to note that something over 250 man hours were spent in developing data for about 450 communities in southern California, Arizona and Nevada.

Southern California includes coastal, agricultural, metropolitan and desert localities. Design temperature data are published in The ASHAE Guide[1] (Reference 1, Chapter 12, Table 1, p. 251) for 5 cities in this area, *viz*: Bakersfield, Burbank, Daggett, Los Angeles and San Diego. The winter climate varies from Coronado near San Diego, where frost is unknown, to Bodie in the High Sierras where −36 F has been recorded. The summer climate ranges from an August normal daily maximum of 69 F in Santa Monica to 116 F for the equivalent figure at Greenland Ranch in Death Valley, whose record reading of 134 F stands as the official all-time high in the United States.

It is apparent that the heating and cooling loads must vary widely, sometimes from town to town. For example, the airline distance between Santa Monica and Los Angeles is 14 mi, and the summer temperatures change slightly more than 1 deg per mile in that distance.

Sources of Data

All known applicable Weather Bureau publications were consulted (for list, see References and Bibliography). In addition, study was given to the recommended design temperatures published by this Society, the ASRE,[2] and several manufacturers, distributors and engineering offices. For summer data, the publication, *Summer Weather Data*[3] and the Air Force *Compilation of Air Weather Service Weather Data*[4] were drawn on heavily. Tabulations from log sheets of private observers, fire stations and packing houses were used.

Unpublished data from the files of the Fruit Frost Service[5] in Pomona were utilized in checking winter isotherms.

Data from so many sources naturally developed some inconsistencies, but surprisingly few cases of large differentials, say 5 deg or more. Much more typical was the case of Reno, Nevada, whose recommended summer design dry-bulb temperatures from several sources were 96, 94, 92, 93 and 95 F.

Scope of Work

It is the responsibility of the Society committees to develop standards of design, such as the TAC 2½ percent method of establishing a summer design dry-bulb temperature. The assigment of the Task Force was to find methods, preferably simple ones, of developing *equivalent* design temperatures: methods which, when applied to cities for which official temperatures had been developed, would give the same answers; and to do this for as many towns as possible. This scope ruled out time-consuming statistical methods; no computor was available. It was decided not to limit the study to larger towns, for a crossroads of today may be an aggressive building development tomorrow. It was decided also to include nearly every locality where a weather station had ever been located, even including a few spots no longer inhabitated, for they helped to develop data for nearby thriving communities without weather stations.

The original tables were developed from Weather Bureau figures up to 1930. Where later data were published in Annual Summaries, these were also taken into account, particularly for temperatures showing highest or lowest of record. It is interesting that for the towns having pre-1930 records, 51 new highs and 55 new lows have been recorded since 1930. (Summers are getting hotter and winters are getting colder.)

Winter Design Data

In general, 3 bases for winter data were available: (1) Common Use, (2) the TAC 97½ percent basis, and (3) the Thom[6] 0.075 figures. A comparison of these for some western cities is shown in Table 1.

Although the choice of cities may seem arbitrary, it is simply that those listed are all the western cities for which all 3 bases were available. The average of the Thom[6] 0.075 scale is 3 deg below the average of Common

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*Partner, Holladay & Westcott. Member of ASHAE.

[1] Exponent numerals refer to References.

For presentation at the 64th Annual Meeting of the American Society of Heating and Air-Conditioning Engineers, Pittsburgh, Pa., January 1958.

Use, while the TAC 97½ percent scale is 10.1 deg above the Thom[6] 0.075 and 7.1 deg above Common Use. The Thom 0.075 scale was deliberately chosen by its author to approximate the level of Common Use, so the agreement is not surprising. The fact that the TAC 97½ scale gives such high readings is a reason for its unpopularity. It is reported that the scale is not being used because experienced engineers think it does not give enough factor of safety for equipment sizing. Hence, there is a need to develop a scale which gives the same general level of answer as either the Thom 0.075 or Common Use.

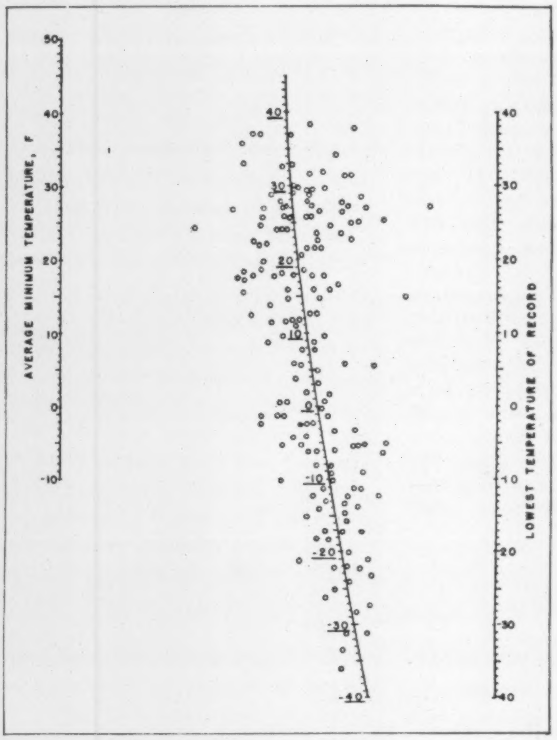

Fig. 1 — Winter design temperature nomograph. Points represent average annual minimum temperatures

In 1947[7] the author offered the hypothesis that a winter design temperature could be developed by some relationship between the average daily minimum temperature in the coldest month (January, without exception) and the lowest temperature of record. Since both these figures were published for all Weather Stations, efforts were made to correlate them both to the Thom 0.075 base and the Common Use. The correlations were not satisfactory for some or all of the following reasons:

(1) Common Use is simply an average of the opinions of several people (in a small town, maybe the opinion of one person), and the figures are not necessarily of the same order of verity.

(2) Common Use figures are usually rounded to the nearest 5 deg.

(3) The Thom 0.075 base is the result of a statistical analysis of the average temperature of the coldest *day* each year for the period 1921-1950.

Since the correlation figures used by the Task Force were for the average minimum of the coldest month (the average of a series of *night* temperatures) and the lowest of record (a *night* temperature) and for periods ending in most cases in 1930, satisfactory correlation should not have been expected.

The next effort at correlation involved the use of the average annual minimum temperature, published in THE ASHAE GUIDE and available from enough of the larger weather stations for a satisfactory correlation test. It was learned from attempt that the average annual minimum not only developed a satisfactory and consistent relationship with the 2 suggested temperatures, but also, by coincidence, averaged 1.1 deg above the average of the Common Use figure for 115 test cities.

Table 1 — Winter design bases for some western cities
(All figures in Fahrenheit degrees)

State	Station	Common Use	TAC 97½%	Thom[6] 0.075
Ariz.	Phoenix	25	31	36
Calif.	Fresno	25	32	32
	San Diego	35	43	43
Colo.	Denver	−10	0	−12
	Pueblo	−20	2	−14
Idaho	Boise	−10	5	−10
	Pocatello	− 5	6	−17
Mont.	Billings	−25	−17	−31
	Miles City	−35	−18	−35
Nev.	Reno	− 5	0	3
N. Mex.	Albuquerque	0	16	8
Ore.	Portland	10	22	10
Utah	Salt Lake City	−10	7	− 1
Wash.	Seattle	15	24	15
	Spokane	−15	4	−16
Wyo.	Cheyenne	−15	− 3	−19
Averages		2.5	9.6	−0.5

In other words, the average annual minimum temperature was found to represent a satisfactory temperature level for a Winter Design, since in the aggregate it is approximately the same as the temperature in *Common Use.* Where this figure was available for 10 years or more, it was used as a Winter Design Temperature.

Several methods of weighting the January average minimum temperature and the lowest of record were tried, but it was found that the weighting factor required to obtain the Average Annual Minimum was not constant, but varied with the design temperature level: the colder the climate, the more important the lowest of record became. To avoid burdensome arithmetic, a graphical solution was employed, as shown in Fig. 1. To use Fig. 1 to determine a Winter Design, a straight edge is placed over the correct figures for Average Minimum Temperature and Lowest Temperature of Record, and one reads the recommended design temperature on the center curve.

Table 2 — Comparison of Task Force recommendations with other bases (*All figures are in Fahrenheit degrees*)

State	Station	Common Use	Avge Annual Min	Task Force Recommended Design
Ariz.	Phoenix	25	26	25
Calif.	Fresno	25	26	27
	San Diego	35	37	38
Colo.	Denver	−10	−11	−12
	Pueblo	−20	−13	−11
Idaho	Boise	−10	− 1	−10
	Pocatello	− 5	−12	− 8
Mont.	Billings	−25	−30	−28
	Miles City	−35	−30	−30
Nev.	Reno	− 5	− 1	− 2
N. Mex. ..	Albuquerque	0	2	3
Ore.	Portland	10	18	14
Utah	Salt Lake City	−10	− 2	− 3
Wash.	Seattle	15	20	18
	Spokane	−15	− 5	−11
Wyo.	Cheyenne	−15	−18	−19
Average		−2.5	+0.4	−0.6

Due to the nomograph construction, the deviation are smaller than the point clusters would indicate. Temperatures are read on a vertical scale, and the deviation of any point from the curve is approximately the tangent of the angle the straight edge makes with the horizontal, which runs from about 16 to 33 deg. Hence the average deviation is from 0.29 to 0.64 of the horizontal distance of a point from the line. The worst case investigated is that of Miami, Fla., whose average annual minimum is 38 F; but the recommended design temperature by this method would be 45 F. The correlation of this method for the western cities tabulated in Table 1 is given as Table 2.

In other words, a method has been developed which, very simply, yields a recommended Winter Design Temperature correlating closely with the accepted level. The method may then be applied to any city for which January Average Minimum Temperature and Lowest of Record are available, and some faith may be placed in the result.

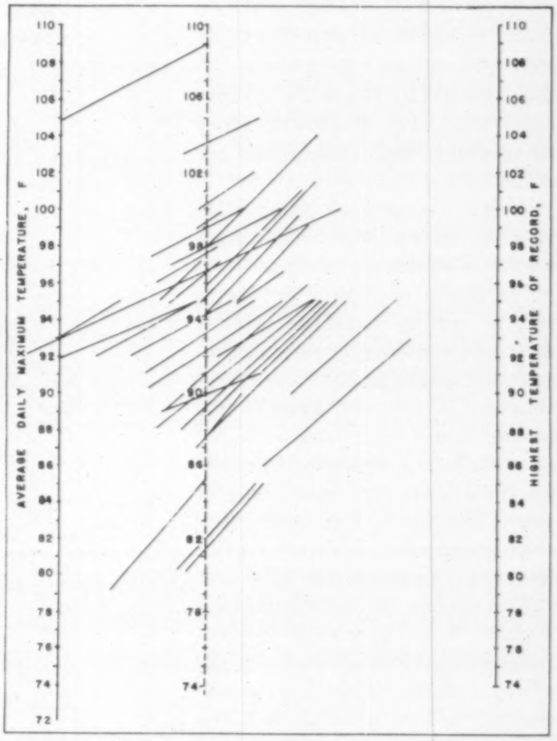

Fig. 2 — Summer design dry-bulb nomograph. Lines represent range of suggested design dry-bulb temperatures for given cities

For those communities where no weather station ever operated, Winter Design Temperatures were chosen by averages of nearby temperatures, sometimes by isotherms. A knowledge of the terrain, elevations and prevailing wind, as well as acquaintance with local jobs that did or did not operate satisfactorily, were invaluable in estimating such temperatures. These cases were estimated to the nearest 5 degrees.

Summer Dry-Bulb Design Temperatures

With satisfactory experience in the use of the Average Annual Minimum, it was natural to turn to the Average Annual Maximum as a guide for the average level of summer dry-bulb design temperatures. A very few trials showed that the Average Annual Maximum was from 5 to 10 deg above the accepted design dry-bulb level, and showed no useful correlation with, for example, the *Summer Weather Data*[3] or THE GUIDE 2½ percent figures. (Reference 1, Chapter 13, Table 2, p. 279).

Again, it is believed that an acceptable Summer Dry-Bulb Design Temperature should lie somewhere between the Average Daily Maximum for the warmest month† and the Highest of Record. Therefore, a nomograph was plotted (Fig. 2) with these lines as boundaries, lines representing the spread of accepted Design Temperatures from these sources, *viz*: *Summer Weather Data*[3]

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†Unlike the Average Daily Minimum, which always occurs in January, the Average Daily Maximum in the West may occur in any month from June through September.

Table 3 — Unusually wide variation among accepted summer dry-bulb design temperatures

(All figures in Fahrenheit degrees)

	Common Use	2½%	Guide 2½%
San Diego	85	81	79
Detroit	95	93	89
Helena	95	89	
Newark	95	91	89
Buffalo	93	87	86
Pittsburgh	95	91	88
Brownsville	100	92	

2½ percent, THE GUIDE 2½ percent, and Common Use, and for the about 60 cities for which these 3 data are available.

Several examples of rather wide variation among these 3 figures appeared as shown in Table 3.

The figures in Table 3 are shown only to indicate that there exists a diversity of opinion as to what constitutes a good summer design temperature. Where two different 2½ percent figures occur, it must be because the source data came from different locations or from different years. THE GUIDE 2½ percent data are from airports; in some cases this may make a considerable difference.

The average of the 67 *Summer Weather Data* 2½ percent numbers from Reference 3 is 93.9 F. The average of the sixty 2½ percent numbers in THE GUIDE is 93.2, and the average of the Common Use number is 93.7. Therefore, while local differences of opinion or data certainly exist, there is good agreement as to what the general level should be. If one takes figures from the dotted vertical line on the nomograph, Fig. 2, the average of 60 cities is 93.1, and the resulting design temperature lies on the line (that is, within the range of the 2 or 3 presently accepted numbers) for 39 out of the 60 cities. For another 8 cities, the nomograph gives an answer within 1 deg of one of the accepted figures. For the other 13 cities, the deviation is from 2 to 5 deg, either up or down. Two to 5 deg is almost typical of the spread among the three *accepted* figures.

The dotted vertical line on the nomograph is an effort to correlate the somewhat conflicting data in terms of the parameters chosen, namely: Average Daily Maximum Temperature and Highest Temperature of Record. A simple weighted average can be used instead of the nomograph, thus:

Design Dry-Bulb Temperature = [2 (Av Daily Max) + (Highest of Record)]/3

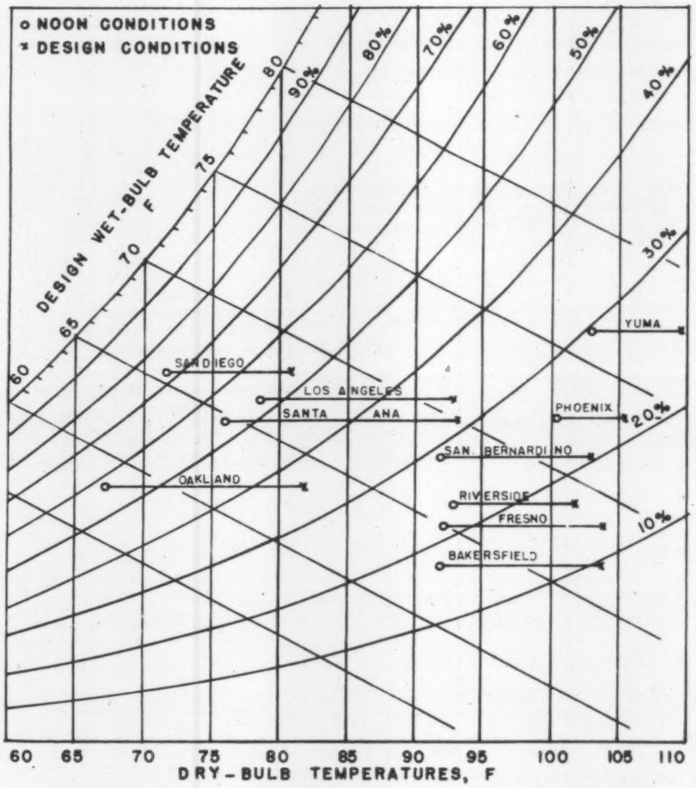

Fig. 3 — One method of obtaining design wet-bulb temperatures

Summer Wet-Bulb Design Temperatures

Finding wet-bulb design figures proved to be the most difficult of the problems faced. It was approached from several directions.

Many weather stations publish relative humidities at or near noon. Simultaneous dry-bulb temperatures are also available, from which average noon wet-bulb temperatures were obtained. If a horizontal line is drawn on a psychrometric chart from this average noon dry-bulb and wet-bulb temperature to the summer Dry-Bulb Design Temperature, a *Wet-Bulb Design Temperature* may result* (see Fig. 3).

Summer Weather Data[3] includes a table, *Analysis of Wet-Bulb Temperatures on a 24-Hr Basis,* listing hours *vs* wet-bulb temperature for the months June through September for 67 U. S. cities. If these data are plotted on 3-cycle semi-log paper, slopes are developed which are characteristic of the general locality (mountain, coastal, etc). The TAC recommends that the wet-bulb design temperature be taken as that which is exceeded during 5 percent of the hours for the 4 summer months: actually, 146.4 hr for the *Summer Weather Data*.

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*The method was devised by Douglas Hotes, a member of the Task Force.

The Air Weather Service has published for many airport localities, both domestic and foreign, the number of hours for 6 summer months when wet-bulb temperatures exceed the 2 levels of 67 F and 73 F. When these points are plotted on the same chart as the *Summer Weather Data*,[3] and the latter characteristic curve shape is matched, interpolation to 146 hr is possible. In some cases, judicious extrapolation may be used. The *Summer Weather Data* period is 2928 hr and the Air Weather Service period is probably 5160 hr — the 6 *warmest months* may not be the same for each location. It is believed that the change of hours for given wet-bulb levels by the addition of 2 fall or spring months is likely to be slight, and some random tests for cities having both *Summer Weather Data* and Air Weather Service data show good correlation. Sample plots are shown in Fig. 4.

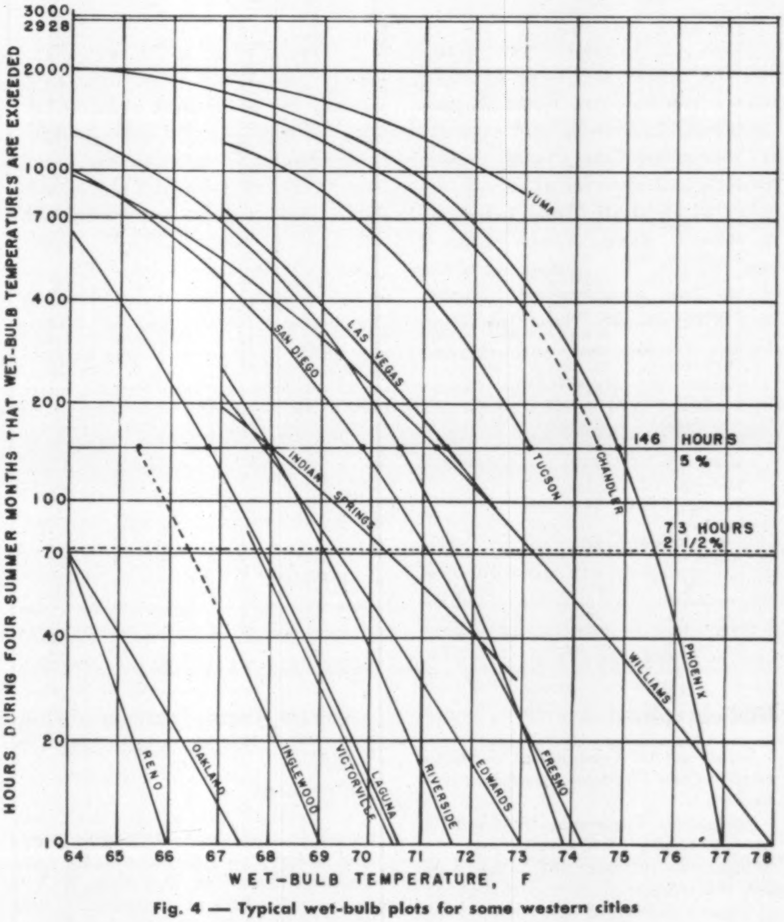

Fig. 4 — Typical wet-bulb plots for some western cities

Again, the psychrometric chart method was tested by comparison with the *Summer Weather Data* 5 percent figures, with the Air Weather Service 146-hr interpolations, and with the Design Wet-Bulb Temperature in Common Use from THE GUIDE. The comparison is shown in Table 4.

The final method used was to spot Wet-Bulb Design Temperatures believed to be trustworthy on a large scale map and to interpolate intermediate points, correcting for elevation, presence of bodies of water, and terrain where necessary.

Arguments on wet-bulb design temperatures can generate more heat than any kindred subject. The numbers here presented are the best the Task Force was able to hammer out, and that's all that is claimed for them. There is, however, one discussion that maybe can be resolved: whether or not the wet-bulb temperatures are increasing due to greater usage of water. The official position of the Weather Bureau, as taken from Local Climatological Data, Phoenix, Ariz., 1956 (and previous years) is:

> The central floor of the Salt River Valley is irrigated by water from dams built on the Salt River system. To the north and west of the gravity flow irrigated district there is considerable agricultural land irrigated by pump water. There is no evidence that the irrigation has in any way

Table 4 — Typical wet-bulb design temperatures

State	Station	Common Use	*Summer Weather Data*[3]	Air Weather Service	So. Calif. Task Force
Ariz.	Chandler		74[a]	76	75
	Flagstaff	65	67[a]		66
	Phoenix	76	75	75	76[b]
	Tucson	72	72[a]	73-74	73
	Yuma	78	80[a]		78
Calif.	Bakersfield	70	68[a]		70[b]
	Fresno	74	70	70	70
	Inglewood		67[a]	66	67
	Los Angeles	70	67[a]		71
	March Field		69[a]	70	68
	Oakland	65	63	Below 64	63
	Oxnard		65[a]	66	66
	Riverside		68[a]	68	71
	San Bernardino			72	72
	San Diego	68	70	68	71
	Santa Ana			69	70
Nev.	Las Vegas	75	72[a]	72-73	72
	Reno	65	62	63	62
	Winnemucca	65	61[a]		61

[a] Indicate interpolation from contours, *Summer Weather Data* Chap. 7, Fig. 1.
[b] These figures obtained by statistical analysis of recent years.

affected the relative humidity in the valley. The average daytime relative humidity is 29 percent based on observations at 11:30 a.m. and 5:30 p.m.

This present investigation does not reach the same conclusion. A comparison of figures for number of hours at and above given wet-bulb temperatures (*Summer Weather Data*[1] Method) for Phoenix shows the figures in Table 5.

Table 5 — Comparison of number of hours per year at or above given Wet-Bulb Temperatures for Phoenix, Ariz.

Wet-Bulb, Fahr.	Hours per year 1930-34	Hours per year 1953-56
71	941	942
72	741	758
73	472	552
74	275	366
75	130	195
76	44	74
77	10	18
78	3	3
79		1
80		1
81		1
82		1
Design, 5% basis	74.8 F	75.4 F

Therefore, if these years, shown in Table 5, are typical, the design wet-bulb temperature in Phoenix is increasing at the rate of 0.03 F deg per year.

General

Preliminary copies of the findings of the Task Force were presented to the Chapter's Research Committee on June 4, 1957. At this writing not enough time has elapsed to determine whether the volume of disagreements will be small or large. Surely some changes and needs for improvement will develop with the use of the tables. The Task Force has been reappointed as a standing committee to review requests for changes and additions and to incorporate them into the next printing of the report. Table 6 is a sample page of the completed 16-page report.

Where the need for local climatic weather data exists, as must be the case in many coastal and mountain areas, this kind of project can be instituted by local chapters of the Society as a part of the continuing effort of the profession to improve design information.

Table 6 — Sample page from Southern California Design Temperature Report

	Tentative Outdoor Design Temperatures								
		SUMMER					WINTER		
				Rec. Design					
	Elevation, Ft	Avg Daily Max	Highest of Record	Dry-Bulb	Wet-Bulb	Outdoor Daily Range	Avg Daily Min	Lowest of Record	Recommended Design
La Puente	320			100	70	32			30
La Verne	1050			100	69	36			30
Lawndale	66			85	67	16			35
Lemon Grove	437			95	72	22			30
Lennox	71			85	67	16			35
Lido Island	7			80	68	12			35
Llano	3820	95	112	101	72	33	32	8	19
Lomita	56			90	67	14			35
Lompoc	72			90	65	20			30
Lone Pine	3950	94	105	98	65	39	24	2	11
Long Beach	34	80	108	89	68	19	42	21	33
Los Alamitos	20			90	69	20			35
Los Angeles	312	84	110	93	71	22	45	28	37
Los Nietos	194			95	70	24			35
Lundy Lake	7760	77	90	81	63	27	16	−34	−16
Lynwood	88			90	70	20			35
Lytle Creek	2250	91	111	98	69	39	44	19	31
Malibu	18			80	64	14			35
Manhattan Beach	120			80	66	14			35
March Field	1534			98	68	38			25
Maricopa	680		116	105	67	34		19	26
Maywood	170			90	70	22			35
Mecca	−185	106	126	113	76	30	37	13	24
Mill Creek No. 2	2965	91	108	97	70	26	41	16	28
Modjeska	1240			95	70	32			25
Mojave	2775	103	118	108	71	34	30	10	19
Monrovia	562			95	70	30			30
Montebello	205			95	70	24			35
Monterey Park	380			95	71	26			30
Montrose	1224			95	71	34			30
Moorpark	500			100	72	38			25
Morongo Valley	2587			105	73	34			25
Moneta	36			90	67	20			35
Mount Wilson	5709	84	100	89	67	21	34	7	17
Naples	26			85	68	18			35
National City	34			90	71	12			35
Needles	913	108	125	114	75	28	39	18	27
Nellie	5000	84	100	89	67	27	31	9	19
Newhall	1243		113	100	71	38		10	20
Newport Beach	10		99	80	68	14		31	34

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Fan Noise Variation with Changing Fan Operation[†]

By R. D. Madison* and J. B. Graham**, Buffalo, N. Y.

SUMMARY—The variation of sound-power level of fans with changes in capacity, pressure, speed, size and horsepower is set forth in a series of Sound Laws for fans. Methods of computing sound-power levels at various points of rating are shown. Suggestions are made covering the presentation of overall and octave-band sound-power level data by fan manufacturers in a form that will be convenient and useful to the design engineer.

Evaluation of ventilation system noise in occupied spaces has assumed greater importance in the past few years, and the engineering factors in this evaluation have been under study by many people. The ASHAE has sponsored work at its own laboratory in Cleveland, which resulted in the presentation of a paper[1] at the 1957 Semi-Annual Meeting at Murray Bay. Progress has been made toward establishing a new sound code for the heating and ventilating industry that will be of material assistance to engineers in designing new systems or in improving the acoustic characteristics of existing systems. The background material on this subject was extremely well covered at the summer ASHAE Meeting, at which time a number of papers were presented and a Symposium was held[2]. The subject material covered was broad in scope, but all material was aimed at evaluation of system noise. It is generally agreed that one of the most important factors in determining system noise is the evaluation of fan noise.

The problem of fan noise has been approached by an evaluation of methods of determining the sound power of a fan, techniques of measurement, proposed standards and application of standards. Previous papers on fan noise have been concerned primarily with techniques of determining sound power, with proposed codes and standards, with noise criteria and with applications of fan noise data to ventilating systems. The purpose of this paper is to discuss the fan as a source of noise and to describe the changes in fan sound power as a function of capacity, pressure, size and speed.

Fan Types

To investigate the sound-power characteristics of fans, several types of centrifugal, axial and propeller fans were studied. Fan types were so selected as to permit use of geometrically similar fans to provide wide variation of parameters so that excessive extrapolation would not be necessary. Some of the various fans used in this study are shown in Figs. 1, 2 and 3.

Room

A room 66 ft long × 44 ft wide × 16 ft high (46,500 cu ft) was used for the sound-power investigation of these fans. The room was considered to approximate the requirements for a reverberant space. It was, in general, acceptable under some of the proposed test codes. Calibration of the room was made by using the same noise generator used in the evaluation studies at the ASHAE Laboratory. Overall sound-power level readings and octave-band power-level values for the noise generator were the same as used by the Research Laboratory. A survey of the room, using a rectangular co-ordinate system, showed that it would be advisable to use the average of 4 or 5 readings to obtain good values for evaluation. Variations and averages of sound-pressure level for this room, using the sound generator as a noise source, are shown in Fig. 4. In the comparisons described herein the average values from this curve were used. The room construction was of concrete block walls, concrete floor and steel pan construction ceiling.

Instrumentation

Sound-pressure level measurements were made using a Type 759-B sound-level meter coupled to a Type 420-A octave-band analyser for frequency analysis.

Techniques of Measurements

Measurements were made on the centrifugal and axial fans by setting up standard *NAFM* test duct arrangements. The fan was located in the reverberant room with the discharge duct projecting through the wall into an adjacent room and no duct on the fan inlet. Readings of sound-pressure level were taken in

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[†] It is planned to publish the Appendix to this paper in the TRANSACTIONS 1958.

*Consulting Engineer, Buffalo Forge Co. Member of ASHAE.

**Director of Research, Buffalo Forge Co. Member of ASHAE.

[1] Exponent numerals refer to References.

For presentation at the 64th Annual Meeting of the AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS, Pittsburgh, Pa., January 1958.

the reverberant field around the fan, with no reading taken closer than 10 ft. Power-level values were then calculated, using the formulae shown in the Appendix†. It is recognized that sound-pressure measurements taken in this manner are sound pressures that result from inlet noise and radiated sound from the fan housing. Of more importance for most noise evaluations is the sound power radiated by the fan into the discharge duct. At the time of these tests there was not a completely acceptable method of determining sound power in the discharge duct. However, it is felt that the techniques used in this study provide accurate data to establish the sound-power relationships for changes in fan capacity, pressure, size and speed. When an acceptable method is established, further work will be done to determine the necessary correlation between the present data and the new data.

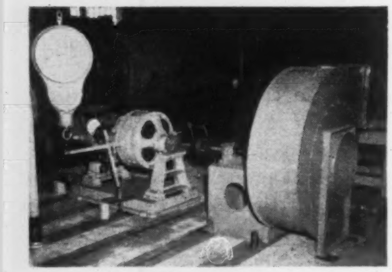
Fig. 1 — Fan type included in study

Directivity was not a factor in this study, since the reverberant room technique does not lend itself to a study of this kind.

Fan Laws

The performance curve of a centrifugal fan is shown in Fig. 5. Typically, these curves are drawn for a given size of fan of a specific type and operating at a given speed. Performance characteristics of the same type of fan, with size and speed as variables, may be determined by use of the fan laws. For reference, these laws are shown in Table 1. A knowledge of the operation of these fan laws is essential to an understanding of the Sound Laws for fans described later. Fan law calculations apply only to equivalent points of rating on a set of fan curves. This is illustrated in Fig. 6 where a *base curve* is shown with a *computed curve* and the equivalent points of rating "A" and "B" shown on each curve. This illustrates an example of a change in fan speed and is an application of Fan Law 1, 2, 3 or 4.

It should be noted that point "A" is at 75 percent of free delivery capacity and 67 percent of shutoff static pressure and that the equivalent point of rating "B" on the lower speed curve is also at 75 percent of free delivery capacity and 67 percent of shutoff static pressure. Sample calculations are included in the Appendix in the TRANSACTIONS.

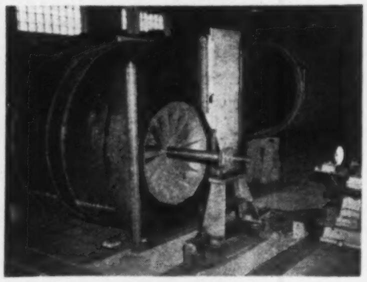
Fig. 2 — Another type of fan studied

In a similar manner, Fig. 7 illustrates the application of Fan Law 2, 5, 7 or 9 and represents equivalent points of rating at constant pressure. In this case the performance curves represent different sizes of geometrically similar fans operating at different speeds. Fig. 8 illustrates the application of Fan Laws 3, 5, 6 and 8, and represents equivalent points of rating at constant capacity. Again, these performance curves represent different sizes of geometrically similar fans operating at different speeds.

It must be understood that there is no way to calculate the conditions at some random Point "C" (Figs. 6, 7, 8) on the computed curve by starting at Point "A" on the base curve. To compute conditions of Point "C," calculations must be based on the equivalent point of rating on the base curve. These explanations illustrate several of the most useful fan law calculations but do not cover all possible combinations. A more complete explanation is contained in Reference 4.

Instead of using a particular performance curve as shown in Fig. 1 for fan calculations, it is often convenient to define the characteristics of a type of fan by a single curve. One way to do this is to make use of the specific speed of the fan. Specific speed in fan work is based on static pressure and is the revolutions per minute at which a fan of that type would operate to furnish 1 cfm at 1 in. static pressure.

$$N_s = \text{rpm} \times \text{cfm}^{1/2}/P_s^{3/4} \quad ......(1)$$

where

N_s = specific speed.
rpm = revolutions per minute of fan.
cfm = cubic feet per minute.
P_s = static pressure of fan, inches of water.

This will be recognized as a special application of Fan Law 5. Specific speeds are used to establish equivalent points of rating for geometrically similar fans of different size and operating at different speeds.

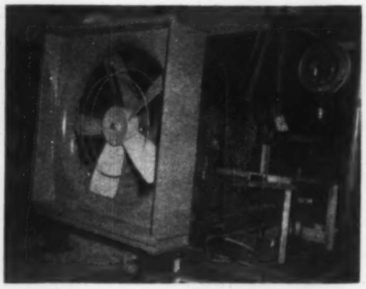
Fig. 3 — A third type of fan studied

Although the foregoing explanation of fan law calculations does not mention fan sound power specifically, an understanding of these laws is necessary for the following discussion of sound power, since a definite relationship can be established between the fan laws and a parallel set of sound laws for fans.

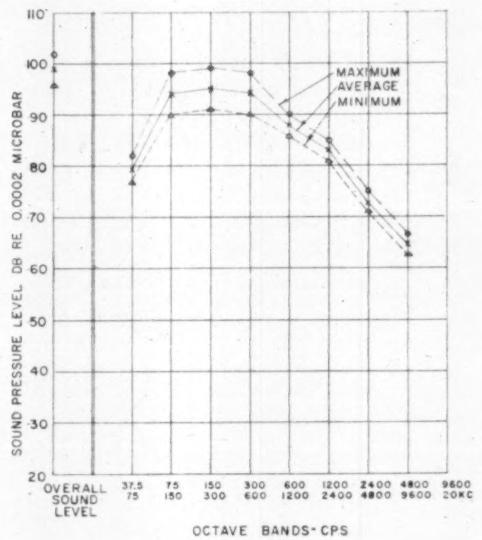

Fig. 4 — Sound-pressure-level values for reverberant space using sound generator as noise source

Fan Noise

The noise generated by a fan falls into the two general classifications of rotational noise and vortex noise.[3,4] Rotational noise is created by a blade as it passes a given point and gives rise to a fundamental tone commonly known as the blade frequency.

$$f_B = \text{rpm} \times B/60 \quad \ldots\ldots\ldots\ldots\ldots (2)$$

where

f_B = blade frequency, cycles per second.

rpm = revolutions per minute of fan.

B = number of blades on fan.

Harmonics of the fundamental tone will be present, but the fundamental tone will be dominant in the sound spectrum as shown by the typical octave-band analysis. The intensity of the blade noise is determined by the shape of the air impulse. Vortex noise is a broad-band noise in the fan due to turbulence or unstable flow in the fan. If the flow were laminar throughout, little vortex noise would be generated. However, there is usually some separation that generates eddy flow. If the point of flow separation is variable, the eddy flow fluctuates rapidly and creates considerable noise. Even without this fluctuation, however, the eddy flow is a source of broad-band noise. Some of the vortex noise is contributed by Karman vortex trails shed from the trailing edges of the blades, and these vortices, since they are random in character, are likewise a source of broad-band noise. It is obvious from the foregoing that the lowest sound power will occur near the point of maximum efficiency, since this is the point of optimum flow conditions. Also from the foregoing it may be seen that the quantity of air flowing through the wheel and the pressure built up in the wheel will have important effects on the sound power generated by the fan. Furthermore, it is important to consider the size of the fan and the speed at which it operates to produce the given conditions when making calculations of sound power.

An organized approach to this problem is possible by making

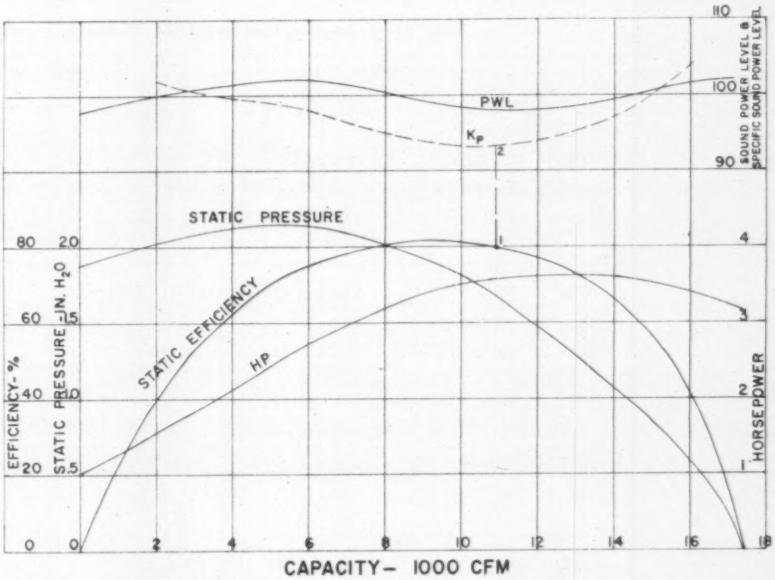

Fig. 5 — Performance curve of a typical centrifugal fan

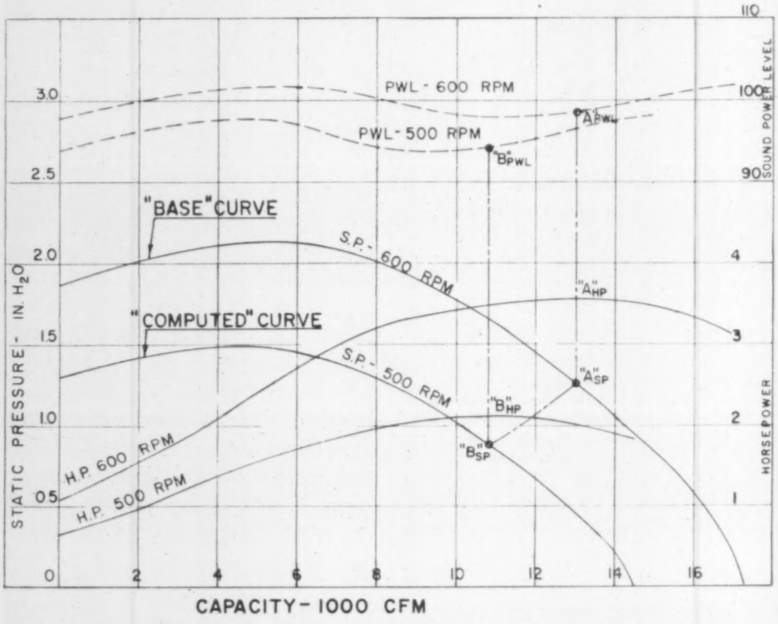

Fig. 6 — Example of computation of a change of speed of the typical fan of Fig. 5

sound-power-level calculations on the same basis as other fan calculations and by restricting the calculations to equivalent points of rating.

As with most problems of this kind, it is impossible to vary only one of the parameters, while holding all others constant, and still maintain the stated restriction of equivalent points of rating. However, it is possible to investigate the effects of one variable by selecting a particular fan law, and while holding one of the independent variables constant, make changes in the other. This change of one independent variable will produce an equivalent point of rating with new values of the dependent variables; and also a sound-power level for the new point of rating.

For example, in one investigation of the size factor, Fan Law 1 was utilized by holding rpm (revolutions per minute) constant and varying size over the range shown in Fig. 9.

Table 1 — Tabular representation of fan laws and of sound laws for fans

LAW NO.	FAN LAWS				SOUND LAWS FOR FANS
	DEPEND. VARIABLE	BASIC DATA	INDEPENDENT VARIABLES	DENSITY CORR.	
1	CFM_S	$= CFM_B$	$\times \left(\frac{SIZE_S}{SIZE_B}\right)^3 \times \left(\frac{RPM_S}{RPM_B}\right)$	$\times (1)$	$PWL_S = PWL_B + 70 \log_{10} \frac{SIZE_S}{SIZE_B} + 50 \log_{10} \frac{RPM_S}{RPM_B}$
	$PRESS_S$	$= PRESS_B$	$\times \left(\frac{SIZE_S}{SIZE_B}\right)^2 \times \left(\frac{RPM_S}{RPM_S}\right)^2$	$\times \left(\frac{\rho_S}{\rho_B}\right)$	
	HP_S	$= HP_B$	$\times \left(\frac{SIZE_S}{SIZE_B}\right)^5 \times \left(\frac{RPM_S}{RPM_B}\right)^3$	$\times \left(\frac{\rho_S}{\rho_B}\right)$	
2	CFM_S	$= CFM_B$	$\times \left(\frac{SIZE_S}{SIZE_B}\right)^2 \times \left(\frac{PRESS_S}{PRESS_B}\right)^{1/2}$	$\times \left(\frac{\rho_B}{\rho_S}\right)^{1/2}$	$PWL_S = PWL_B + 20 \log_{10} \frac{SIZE_S}{SIZE_B} + 25 \log_{10} \frac{PRESS_S}{PRESS_B}$
	RPM_S	$= RPM_B$	$\times \left(\frac{SIZE_B}{SIZE_S}\right) \times \left(\frac{PRESS_S}{PRESS_B}\right)^{1/2}$	$\times \left(\frac{\rho_B}{\rho_S}\right)^{1/2}$	
	HP_S	$= HP_B$	$\times \left(\frac{SIZE_S}{SIZE_B}\right)^2 \times \left(\frac{PRESS_S}{PRESS_B}\right)^{3/2}$	$\times \left(\frac{\rho_B}{\rho_S}\right)^{1/2}$	
3	RPM_S	$= RPM_B$	$\times \left(\frac{SIZE_B}{SIZE_S}\right)^3 \times \left(\frac{CFM_S}{CFM_B}\right)$	$\times (1)$	$PWL_S = PWL_B - 80 \log_{10} \frac{SIZE_S}{SIZE_B} + 50 \log_{10} \frac{CFM_S}{CFM_B}$
	$PRESS_S$	$= PRESS_B$	$\times \left(\frac{SIZE_B}{SIZE_S}\right)^4 \times \left(\frac{CFM_S}{CFM_B}\right)^2$	$\times \left(\frac{\rho_S}{\rho_B}\right)$	
	HP_S	$= HP_B$	$\times \left(\frac{SIZE_B}{SIZE_S}\right)^4 \times \left(\frac{CFM_S}{CFM_B}\right)^3$	$\times \left(\frac{\rho_S}{\rho_B}\right)$	
4	CFM_S	$= CFM_B$	$\times \left(\frac{SIZE_S}{SIZE_B}\right)^{4/3} \times \left(\frac{HP_S}{HP_B}\right)^{1/3}$	$\times \left(\frac{\rho_B}{\rho_S}\right)^{1/3}$	$PWL_S = PWL_B - 13.3 \log_{10} \frac{SIZE_S}{SIZE_B} + 16.6 \log_{10} \frac{HP_S}{HP_B}$
	$PRESS_S$	$= PRESS_B$	$\times \left(\frac{SIZE_B}{SIZE_S}\right)^{4/3} \times \left(\frac{HP_S}{HP_B}\right)^{2/3}$	$\times \left(\frac{\rho_S}{\rho_B}\right)^{1/3}$	
	RPM_S	$= RPM_B$	$\times \left(\frac{SIZE_B}{SIZE_S}\right)^{5/3} \times \left(\frac{HP_S}{HP_B}\right)^{1/3}$	$\times \left(\frac{\rho_B}{\rho_S}\right)^{1/3}$	
5	$SIZE_S$	$= SIZE_B$	$\times \left(\frac{CFM_S}{CFM_B}\right)^{1/2} \times \left(\frac{PRESS_B}{PRESS_S}\right)^{1/4}$	$\times \left(\frac{\rho_S}{\rho_B}\right)^{1/4}$	$PWL_S = PWL_B + 10 \log_{10} \frac{CFM_S}{CFM_B} + 20 \log_{10} \frac{PRESS_S}{PRESS_B}$
	RPM_S	$= RPM_B$	$\times \left(\frac{CFM_B}{CFM_S}\right)^{1/2} \times \left(\frac{PRESS_S}{PRESS_B}\right)^{3/4}$	$\times \left(\frac{\rho_B}{\rho_S}\right)^{3/4}$	
	HP_S	$= HP_B$	$\times \left(\frac{CFM_S}{CFM_B}\right) \times \left(\frac{PRESS_S}{PRESS_B}\right)$	$\times (1)$	

SUBSCRIPT "B" INDICATES VALUES FROM BASE CURVEOR CATALOG—"S" INDICATES VALUES FOR FAN SELECTION

Similarly, the effect of rpm was studied by varying the speed of a given size fan. Other fan laws were used to investigate other variables.

Sound Laws for Fans

Based on tests as just described, the change in sound-power level of a series of homologous fans was found to be a function of fan size, speed, capacity and pressure as shown in the columns labeled Sound Laws for Fans in Table 1. These laws are intended to be applied to the overall sound-power level, but may, with limitations, be applied to octave-band analyses. These limitations are concerned primarily with the blade frequency. Octave-band analyses made under the conditions of these tests show that the peak sound power is in the octave band in which the blade frequency occurs. If the fan speed is changed to such an extent that the blade frequency is shifted to a different octave band, it is necessary to move the peak sound power to this octave in the frequency spectrum.

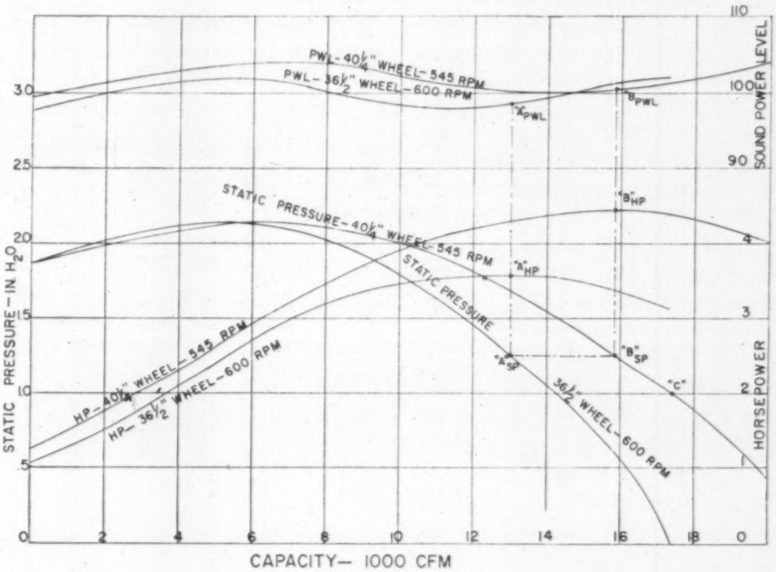

Fig. 7 — Example of computation of constant pressure characteristics

Table 1 (*continued*) Tabular representation of fan laws and of sound laws for fans

	FAN LAWS				SOUND LAWS FOR FANS
LAW NO.	DEPEND VARIABLE	BASIC DATA	INDEPENDENT VARIABLES	DENSITY CORR.	
6	$SIZE_S$ =	$SIZE_B$ X	$\left(\frac{CFM_S}{CFM_B}\right)^{1/3}$ X $\left(\frac{RPM_B}{RPM_S}\right)^{1/3}$	X (1)	$PWL_S = PWL_B + 23.3 \log_{10} \frac{CFM_S}{CFM_B} + 26.6 \log_{10} \frac{RPM_S}{RPM_B}$
	$PRESS_S$ =	$PRESS_B$ X	$\left(\frac{CFM_S}{CFM_B}\right)^{2/3}$ X $\left(\frac{RPM_S}{RPM_B}\right)^{4/3}$	X $\left(\frac{\rho_S}{\rho_B}\right)$	
	HP_S =	HP_B X	$\left(\frac{CFM_S}{CFM_B}\right)^{5/3}$ X $\left(\frac{RPM_S}{RPM_B}\right)^{4/3}$	X $\left(\frac{\rho_S}{\rho_B}\right)$	
7	$SIZE_S$ =	$SIZE_B$ X	$\left(\frac{PRESS_S}{PRESS_B}\right)^{1/2}$ X $\left(\frac{RPM_B}{RPM_S}\right)$	X $\left(\frac{\rho_B}{\rho_S}\right)^{1/2}$	$PWL_S = PWL_B + 35 \log_{10} \frac{PRESS_S}{PRESS_B} - 20 \log_{10} \frac{RPM_S}{RPM_B}$
	CFM_S =	CFM_B X	$\left(\frac{PRESS_S}{PRESS_B}\right)^{3/2}$ X $\left(\frac{RPM_B}{RPM_S}\right)^{2}$	X $\left(\frac{\rho_B}{\rho_S}\right)^{3/2}$	
	HP_S =	HP_B X	$\left(\frac{PRESS_S}{PRESS_B}\right)^{5/2}$ X $\left(\frac{RPM_B}{RPM_S}\right)^{2}$	X $\left(\frac{\rho_B}{\rho_S}\right)^{3/2}$	
8	$SIZE_S$ =	$SIZE_B$ X	$\left(\frac{HP_B}{HP_S}\right)^{1/4}$ X $\left(\frac{CFM_S}{CFM_B}\right)^{3/4}$	X $\left(\frac{\rho_S}{\rho_B}\right)^{1/4}$	$PWL_S = PWL_B + 20 \log_{10} \frac{HP_S}{HP_B} - 10 \log_{10} \frac{CFM_S}{CFM_B}$
	RPM_S =	RPM_B X	$\left(\frac{HP_S}{HP_B}\right)^{3/4}$ X $\left(\frac{CFM_B}{CFM_S}\right)^{5/4}$	X $\left(\frac{\rho_B}{\rho_S}\right)^{3/4}$	
	$PRESS_S$ =	$PRESS_B$ X	$\left(\frac{HP_S}{HP_B}\right)$ X $\left(\frac{CFM_B}{CFM_S}\right)$	X (1)	
9	$SIZE_S$ =	$SIZE_B$ X	$\left(\frac{HP_S}{HP_B}\right)^{1/2}$ X $\left(\frac{PRESS_B}{PRESS_S}\right)^{3/4}$	X $\left(\frac{\rho_S}{\rho_B}\right)^{1/4}$	$PWL_S = PWL_B + 10 \log_{10} \frac{HP_S}{HP_B} + 10 \log_{10} \frac{PRESS_S}{PRESS_B}$
	RPM_S =	RPM_B X	$\left(\frac{HP_B}{HP_S}\right)^{1/2}$ X $\left(\frac{PRESS_S}{PRESS_B}\right)^{5/4}$	X $\left(\frac{\rho_B}{\rho_S}\right)^{3/4}$	
	CFM_S =	CFM_B X	$\left(\frac{HP_S}{HP_B}\right)$ X $\left(\frac{PRESS_B}{PRESS_S}\right)$	X (1)	
10	$SIZE_S$ =	$SIZE_B$ X	$\left(\frac{HP_S}{HP_B}\right)^{1/5}$ X $\left(\frac{RPM_B}{RPM_S}\right)^{3/5}$	X $\left(\frac{\rho_B}{\rho_S}\right)^{1/5}$	$PWL_S = PWL_B + 14 \log_{10} \frac{HP_S}{HP_B} + 8 \log_{10} \frac{RPM_S}{RPM_B}$
	CFM_S =	CFM_B X	$\left(\frac{HP_S}{HP_B}\right)^{3/5}$ X $\left(\frac{RPM_B}{RPM_S}\right)^{4/5}$	X $\left(\frac{\rho_B}{\rho_S}\right)^{3/5}$	
	$PRESS_S$ =	$PRESS_B$ X	$\left(\frac{HP_S}{HP_B}\right)^{2/5}$ X $\left(\frac{RPM_S}{RPM_B}\right)^{4/5}$	X $\left(\frac{\rho_S}{\rho_B}\right)^{3/5}$	

SUBSCRIPT "B" INDICATES VALUES FROM BASE CURVE OR CATALOG— "S" INDICATES VALUES FOR FAN SELECTION

These laws have been found to hold for centrifugal and axial fans over operating ranges normally encountered in commercial and industrial use. Propeller fans have agreed with the aforementioned laws on an overall sound-power-level basis, but have shown some deviation on an octave-band power-level basis. This deviation has occurred between calculated and measured values in the lowest octave band of large (72 in. diam.) fans. The measured values are several db higher than the calculated values. Since, due to maximum permissible stresses, these fans operate at relatively low speeds, it is believed that this low frequency component is due to large vortices from the blades.

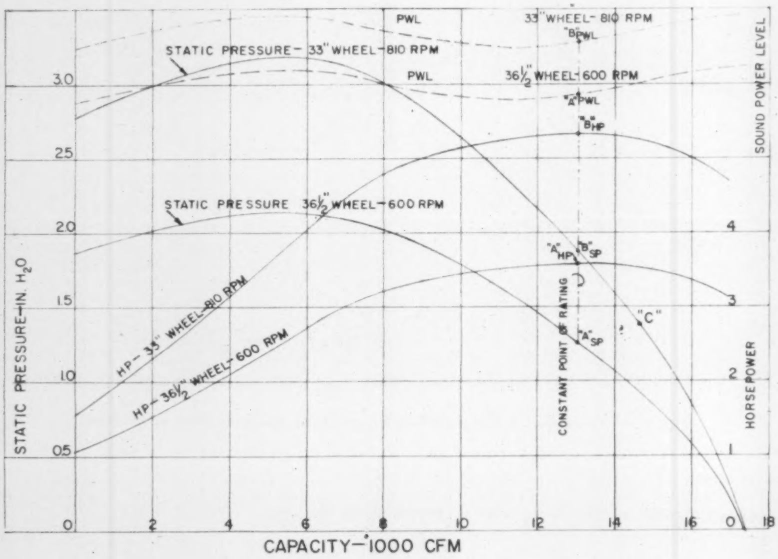

Fig. 8 — Example of computation of characteristics at constant capacity

As emphasized, the Sound Laws for Fans can be used to make calculations for equivalent points of rating only and, since the fan sound-power level is not constant for all points of rating on the performance curve, it is necessary to determine sound-power level at the point of rating at which the fan is to be used.

Sound-power-level curves have been plotted on Figs. 6, 7 and 8 to show the variation of sound-power level with different points of rating and also the variation with equivalent points of rating. The "A" and "B" points are equivalent points of rating.

The question of the variation of sound-power level as a function of horsepower has been raised in the past and conflicting statements have been made as to the proper relationship. It may be seen that when one of the independent variables is horsepower, there are 4 different values of the horsepower ratio by which sound-power level must vary. Selection of the proper ratio depends upon whether the other independent variable is capacity, pressure, size or speed. However, Fan Law 5 states that horsepower varies as capacity multiplied by pressure while sound-power level varies as log (capacity multiplied by pressure squared). Therefore, since either of these values may be chosen at random, the sound will not vary in any prescribed manner based upon horsepower using other fan laws.

Specific Power Level

As pointed out earlier, specific speed is used to describe the characteristics of a series of fans, and in a similar manner the arbitrary term *specific-power level* is used to relate noise characteristics of a geometrically similar series of fans. This term is defined as the power level a similar fan would make when operated at 10,000 cfm, and 1 in. static pressure. A typical specific power-level curve is shown in Fig. 5, plotted against capacity. When the point of rating is known for a particular application, the power level of a fan selection made from this series of fans can be determined by

$$PWL_s = K_p + 10 \log [(\text{cfm} \times P^2)/10{,}000] \quad \text{..................} (3)$$

where

PWL_s = sound-power level of fan selected.
K_p = specific sound-power level at equivalent point of rating.
cfm = cubic feet per minute of fan selection.
P = static pressure of fan selection.

The specific sound-power level curve can be valuable in fan selection where sound is an important consideration. It will be noticed in Fig. 5 that the actual sound-power-level curve is reasonably flat in the region normally used, and there is the mistake of inferring that such a fan may be rated anywhere in that region with equally good results. The specific sound-power curve, however, shows this reasoning to be false, and the fan selection should be made at the minimum value of the specific sound-power curve if the selection is made on noise alone.[4]

Presentation of Data

While the sound laws do not present an unduly complicated computation for the design engineer, it is felt that some simplification of data can be made so that the sound-power level of a fan selection may be readily calculated.[2d] One method of presenting these data to engineers is shown in Figs. 5 and 10 and Table 2. Table 2 is a page from a typical multi-rating table for one size of a geometrically similar series of fans. This page is similar to the multi-rating tables now in use, except that in addition to the values of rpm and horsepower for various values of cfm and static pressure there has been added an efficiency figure for the fan at that point of rating.

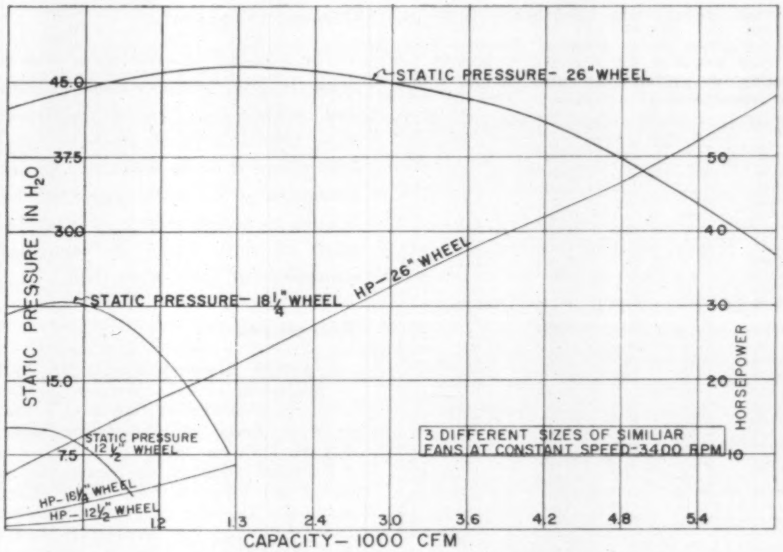

Fig. 9 — Characteristics of 3 different sizes of similar fans at 3400 rpm

A typical fan performance curve, Fig. 5, would be made a part of this table and would include specific sound-power-level values for this fan. Efficiency is constant for a given point of rating so that the efficiency value from the table may be used as a reference point to establish the specific sound-power level of the fan under the particular catalog conditions of interest. Once the specific sound-power level has been determined, the actual sound-power level is calculated from Equation 3.

Further simplification could be made by the fan manufacturer for applications of Sound Law 1 since the appropriate sound-power-level corrections could be worked out for the standard catalog sizes of that fan. The engineer would find it necessary to work out only the speed correction.

In addition to these overall sound-power-level values it would be necessary to include a typical octave-band analysis for this particular series of fans. Information of this type will give the engineer information on the characteristics of the sound for fan noise evaluation.

Octave-band sound-power-level data should be included as a part of the multi-rating tables and may be presented as shown on Fig. 10. Actual values cannot be given but rather correction values to be applied to the overall sound-power level to obtain the values for each band. It will probably be necessary to give values for several speed ranges as shown.

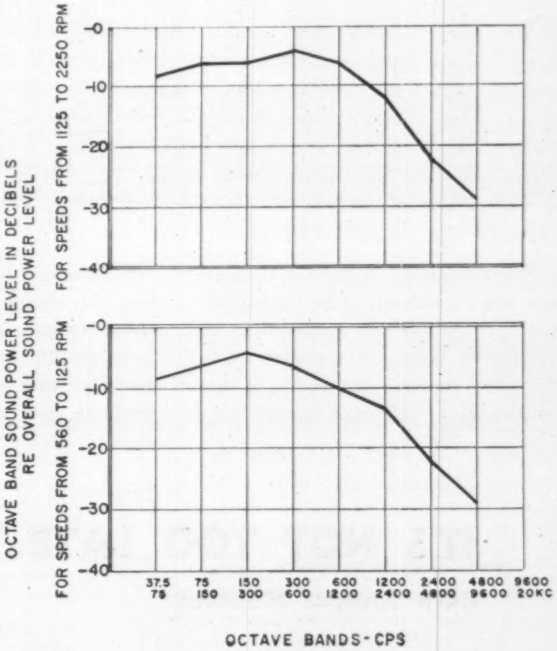

Fig. 10 — Corrections to be made to overall sound-power level to obtain approximate octave band sound-power levels

Special Comments

A word of explanation should be added for those engineers who are unfamiliar with the *sound-power-level* concept. This approach to the evaluation of equipment noise results in absolute numerical values that are higher than those decibel values engineers are accustomed to reading when considering overall *sound-pressure* levels. These sound-pressure levels as reported in the past are now considered to be inadequate for an engineering evaluation of equipment noise. In transferring to the sound-power-level concept, a new framework of reference is necessary, and the engineer must become accustomed to the new and higher numerical values for the equipment he is using.

Table 2 — Example of suggested multi-rating fan performance table (single width wheel, 36½ in. wheel diam.)

cfm	outlet velocity	11 in. SP			12 in. SP			13 in. SP		
		rpm	hp	eff	rpm	hp	eff	rpm	hp	eff
16000	2090	1379	35.71	77.5	1436	39.41	76.6	1491	43.17	75.7
17000	2220	1386	37.44	78.5	1442	41.22	77.8	1497	45.11	77.0
18000	2350	1394	39.20	79.4	1450	43.12	78.7	1503	47.11	78.1
19000	2480	1403	40.97	80.2	1458	45.06	79.5	1511	49.18	78.9
20000	2610	1413	42.69	81.0	1467	46.97	80.3	1519	51.28	79.7
21000	2740	1424	44.45	81.7	1477	48.85	81.1	1529	53.33	80.5
22000	2870	1438	46.39	82.0	1488	50.78	81.7	1539	55.38	81.2
23000	3000	1454	48.49	82.0	1502	52.91	82.0	1550	57.47	81.8
24000	3130	1471	50.66	81.9	1518	55.19	82.0	1564	59.80	82.0
25000	3260	1488	52.92	81.7	1535	57.56	81.9	1581	62.29	82.0
26000	3390	1506	55.32	81.3	1552	60.01	81.7	1597	64.85	81.9
27000	3520	1525	57.80	80.8	1571	62.62	81.3	1614	67.50	81.7
28000	3660	1544	60.37	80.2	1589	65.31	80.9	1633	70.31	81.4
29000	3780	1564	63.01	79.6	1608	68.09	80.3	1652	73.22	80.9
30000	3910	1586	65.72	78.9	1628	70.96	79.7	1670	76.22	80.4
31000	4050	1607	68.52	78.2	1649	73.88	79.1	1689	79.32	79.9
32000	4170	1629	71.42	77.5	1671	76.90	78.5	1711	82.45	79.3
33000	4310	1651	74.43	76.7	1692	80.03	77.8	1732	85.70	78.7
34000	4440	1672	77.41	75.9	1714	83.26	77.0	1754	89.05	78.0
35000	4570	1693	80.48	75.2	1735	86.53	76.3	1776	92.51	77.3
36000	4700	1714	83.65	74.4	1756	89.82	75.6	1797	96.07	76.6
37000	4830	1735	86.93	73.6	1777	93.22	74.9	1818	99.59	75.9
38000	4960	1756	90.31	72.8	1798	96.73	74.1	1839	103.22	75.2
39000	5100	1779	93.94	71.8	1819	100.34	73.3	1860	106.96	74.5
40000	5220	1803	97.70	70.8	1841	104.10	72.5	1881	110.81	73.8

cfm	outlet velocity	14 in. SP			15 in. SP			16 in. SP		
		rpm	hp	eff	rpm	hp	eff	rpm	hp	eff
16000	2090	1544	47.01	74.9	1596	50.90	74.1	1645	54.85	73.4
17000	2220	1550	49.07	76.2	1601	53.10	75.5	1651	57.18	74.8
18000	2350	1555	51.17	77.4	1606	55.33	76.7	1656	59.54	76.0
19000	2480	1563	53.36	78.4	1612	57.60	77.8	1661	61.93	77.2
20000	2610	1571	55.60	79.2	1620	59.97	78.6	1668	64.40	78.1
21000	2740	1579	57.88	79.8	1628	62.38	79.4	1676	66.95	78.9
22000	2870	1589	60.05	80.6	1637	64.80	80.0	1684	69.53	79.6
23000	3000	1599	62.27	81.3	1647	67.14	80.8	1693	72.08	80.3
24000	3130	1609	64.53	81.8	1657	69.52	81.4	1703	74.58	80.9
25000	3260	1625	67.08	82.0	1668	71.96	81.9	1714	77.14	81.5
26000	3390	1641	69.76	82.0	1684	74.75	82.0	1725	79.79	82.0
27000	3520	1658	72.52	81.9	1700	77.62	82.0	1742	82.79	82.0
28000	3660	1675	75.38	81.7	1717	80.59	81.9	1758	85.87	82.0
29000	3780	1693	78.40	81.4	1734	83.65	81.7	1775	89.04	81.9
30000	3910	1712	81.53	81.0	1753	86.89	81.4	1792	92.32	81.7
31000	4050	1731	84.75	80.5	1771	90.24	81.0	1810	95.78	81.4
32000	4170	1750	88.07	80.0	1790	93.68	80.5	1829	99.35	81.0
33000	4310	1771	91.44	79.4	1809	97.23	80.0	1848	103.02	80.6
34000	4440	1792	94.90	78.8	1830	100.83	79.5	1867	106.79	80.1
35000	4570	1814	98.48	78.2	1851	104.53	79.0	1887	110.63	79.6
36000	4700	1836	102.18	77.5	1873	108.34	78.4	1909	114.56	79.0
37000	4830	1858	105.98	76.8	1894	112.26	77.7	1930	118.60	78.5
38000	4960	1879	109.78	76.2	1916	116.31	77.0	1952	122.77	77.8
39000	5100	1899	113.65	75.5	1938	120.40	76.4	1974	127.06	77.2
40000	5220	1920	117.62	74.8	1958	124.50	75.8	1995	131.44	76.5

It should also be pointed out that an attempt has been made here to relate changes in the sound power of fans to changes in fan operating characteristics, and these considerations are limited to this field. There are other sources of noise in fan assemblies, such as unbalance, bearing noise, structural resonance, motor noise, coupling noise and belt noise, but these have not been considered as a part of this problem.

General Comments

The problem of ventilation system noise is a broad and complex one and, since evaluation of fan noise is an important factor in overall system noise, it is hoped that the information given in this paper will be helpful to design engineers in evaluating fan noise under the particular conditions of interest to them.

References

1. ASHAE Research Report No. 1609 — Evaluation of Four Methods for Determining Sound-Power Output of a Fan, by W. F. Kerka (ASHAE Transactions, Vol. 63, 1957, pp. 367-88).

2. Papers presented at Symposium on Sound and Vibration, Semi-Annual Meeting of the American Society of Heating and Air-Conditioning Engineers, Murray Bay, Que., Canada, June 26, 1957, published in the ASHAE Journal Section, *Heating, Piping & Air Conditioning*, as follows: *a.* Noise Control Problems in Air-Conditioning Equipment, by R. J. Wells (August 1957, p. 138); *b.* Techniques of Sound-Power-Level of Unitary Equipment, by R. N. Hamme (September 1957, p. 143); *c.* Sound Standards for Testing and Rating, by H. C. Hardy (September 1957, p. 148); *d.* Application of Sound Standards to Equipment, by R. E. Parker (September 1957, p. 154); *e.* Estimating Octave Band Levels of Noise Generated by Air-Conditioning Systems (September 1957, p. 160). These same papers are available from the Society in a separately bound bulletin.

3. *Handbook of Noise Control*, Chapter 25 — Fan Noise (McGraw-Hill Book Co., Inc., New York, N. Y.).

4. *Fan Engineering*, by R. D. Madison (published by Buffalo Forge Co., Buffalo, N. Y.).

5. *Acoustics*, by L. L. Beranek (McGraw-Hill Book Co., Inc., New York, N. Y.).

6. *Sound and Vibration*, by P. M. Morse (McGraw-Hill Book Co., New York, N. Y.).

IT'S NOT TOO LATE TO GO TO PITTSBURGH

64th Annual Meeting January 27-29, 1958

1957 ANNUAL REPORT OF COMMITTEE ON RESEARCH

H. A. Lockhart, Chairman, and B. H. Jennings, Director of Research

H. A. Lockhart

Heating, ventilating and air conditioning, now as never before, stand at the threshold of further advance and improvement. New materials are being developed, new methods of accomplishment are being found, and different approaches to old problems are coming to light. Both experimental and analytical research and development are contributing new ideas and methods. Research is the lifeblood of progress, and the AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS through its Research Laboratory in Cleveland, through cooperative research, and through the work of its committees and publications is continuing to serve as a focal point for continuing advancement.

B. H. Jennings

During the fiscal year of the Society, November 1, 1956 to October 31, 1957, an active program of research was carried out at the Laboratory and at the cooperating institutions. Twenty actively-constituted technical advisory committees with a total membership of 266 held 36 meetings during the year. The Committee on Research and its Executive Committee met eight times.

Finances and Expenditures

Support of the research program of the Society comes from three sources; the first of these is that portion of the membership dues, amounting to 40 percent which is allocated to research; the second source of funds is the contribution for research from the Exposition; and the third consists of the generous contributions to the program from industrial firms, associations, and individuals. The latter funds are given either for general use or for research along specific lines. Finally, some funds are received for research projects carried out for the United States government or for foundations interested in specific projects of wide general interest. The total expenditures for the year 1956-1957 amounted to $201,623.22. The bar graph (Fig. 1) shows the magnitude of the different funds expended during the current year and during prior years by the Society.

Facilities and Staff

The Research Laboratory, located in Cleveland, consists of two buildings, an office building having a floor space of 5300 sq ft, and a research building of 13,000 sq ft. During the year a significant moderization and improvement program was started on the office building of the Laboratory. The facilities at the Laboratory are very complete and adequate for the type of research which is carried out. The solar calorimetry apparatus, which is particularly well adapted for making solar intensity studies and has recently been used in evaluating the effectiveness of awnings and other shading devices, is housed in a separate building located near one end of the Laboratory's property line.

Work has been intensively under way during the year on a complete rebuilding of the Environment Laboratory. The new facility provides a very flexible test center for carrying out environmental studies under a large number of controlled conditions. Instrumentation for various test projects is continuously being added to and improved with particular emphasis during this year on instrumentation in the field of noise and sound measurement and evaluation.

Committee on Research

H. A. Lockhart, Chairman

E. F. Snyder, Jr., Vice Chairman

One year: R. C. Chewning, W. S. Harris, N. B. Hutcheon, B. H. Jennings*, P. H. Yeomans.

Two years: F. H. Faust, F. K. Hick, M.D., R. C. Jordan, H. A. Lockhart, Arthur Nutting.

Three years: D. D'Eustachio, E. S. Howarth, H. R. Limbacher, E. F. Snyder, Jr., J. I. Trimble.

Executive: H. A. Lockhart, Chairman; E. F. Snyder, Jr., Vice Chairman; N. B. Hutcheon, R. C. Jordan, H. R. Limbacher.

Long-Range Research Program: E. F. Snyder, Jr., Chairman; N. B. Hutcheon, Vice Chairman; R. C. Chewning, F. H. Faust, R. C. Jordan.

*Became Director of Research July 9, 1957

The large amount of current and reference material received by the library is carefully examined and catalogued for future reference, and the present fine library is an effective adjunct to the research operations. The conference room in the library is frequently used for meetings of technical advisory committees, the Committee on Research, and for other Society and outside groups having interests closely related to those of the Society.

The research staff at the Laboratory consisting of project engineers, assistants, administrative staff, a librarian, secretarial and maintenance staff, ranged from 18 to 22 in number during the year. The number varies with the level of activity under way at any given time, and plans are under way to increase the staff during 1958.

In addition to the research work done at the Laboratory, an extensive program of cooperative research is carried out at a number of university and research laboratories throughout the country. Cooperative research projects are encouraged whenever it is felt that the facilities and available research staff at an outside institution can more effectively and expeditiously carry a research project through to completion than might be done at the Laboratory. The benefits of the cooperative program are extensive as they broaden the base on which research can be built, increase the number of researchers available, and create a greater interest in the problems needing investigation. The work at cooperating institutions is closely followed by the research staff and by members of the Technical Advisory Committees, and the reports of cooperative work are all presented at Society meetings and in Society publications.

Over a period of years the results of research carried out at the Laboratory and at cooperating institutions have become a significant part of the useful literature of the field of heating, ventilating, and air conditioning. Much of this material appears in the annual editions of the Heating Ventilating Air Conditioning Guide published by the Society, which is recognized as the authoritative reference work of the profession.

In the following parts of this report, detailed summaries of the research activities carried on at the Laboratory and cooperating institutions are presented. These appear as constituent parts of the summaries of activities carried out by each technical advisory committee (TAC).

Technical Advisory Committee Activities

During this year a modification in the procedural practice in relation to membership on the technical advisory committees was presented to the Council by the Committee on Research and approved at the Council meeting held on October 12, 1957. Appointments to technical advisory committees are made by the chairman of the Committee on Research, and in the past the chairman has had to use this best judgment with a minimum of procedural guidance. The new procedures, which are part of Section 5 of the Operational Guide of the Committee on Research, establish a more specific basis on which technical advisory committee membership appointments are made. They make such appointments open to all qualified Society members but provide generally for a 3-year maximum term of service on any specific committee.

Air Cleaning

E. F. Snyder, Jr.*, Chairman; A. B. Algren, Vice Chairman; J. K. Brixius, L. L. Dollinger, Jr., O. C. Eliason, B. L. Evans, R. S. Farr, W. C. L. Hemeon, E. L. Hill, A. B. Hubbard, Miles Jacoby, M. W. Keyes, G. F. Landgraf, Arthur Nutting*, H. E. Robinson, C. B. Rowe, J. R. Swanton, Jr., W. T. Van Orman.

Since 1954, the TAC on Air Cleaning has provided advisory guidance for a cooperative study of particle technology being carried on at the University of Minnesota. The purpose of the study is the development of fundamental data on the behavior of airborne particulate matter. The study has resulted in the development of improved equipment and techniques for obtaining samples of atmospheric dust and determining the size distribution of the dust particles. A reproducible test dust has been developed, along with dust and lint feeding equipment to be used in filter testing.

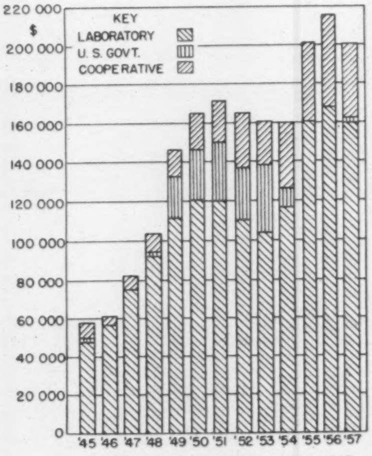

Fig. 1 — Chart showing the nature of Society research expenditures from 1945-1957

The TAC on Air Cleaning held 3 meetings during the past year, and reviewed and approved 2 papers resulting from the project at the University of Minnesota. Additional papers are expected in the immediate future.

Air Distribution

W. O. Huebner, Chairman; H. R. Limbacher*, Vice Chairman; P. A. Argentieri, H. F. Brinen, J. C. Davidson, S. H. Downs, S F. Gilman, Linn Helander, F. B. Holgate, W. W. Kennedy, W. B. Kirk, Alfred Koestel, E. J. Kurek, J. N. Livermore, R. D. Madison, L. G. Miller, H. B. Nottage, L. R. Phillips, C. H. Randolph, N. S. Shataloff, H. E. Straub, R. D. Tutt, Hrant Yousoufian.

The committee held two meetings in 1957 at which plans and programs were discussed and attention was given to the several following research projects in which the Committee is interested.

Case Institute of Technology: A pioneering paper on the performance of radial flow outlets by Professor Koestel was presented at the Semi-Annual Meeting. Professor Koestel has prepared a paper on room air distribution (warm air), and work on proposed Air Distribution Bulletin should be started soon.

Kansas State College: A final paper on downthrow of heated air jets from various outlets by Helander, Yen and Tripp was presented at the 63rd Annual Meeting. Also a paper on downthrow of heated air from an *ASME* Nozzle by Knaak was presented at the Semi-Annual Meeting in June. Kansas State has submitted to the TAC at its request a research proposal for the determination of heat losses and gains from metal and non-metallic ducts. A Subcommittee headed by Mr. Kennedy is investigating this matter, and the chairman believes that the project will materialize soon.

University of Buffalo: The TAC is highly interested in research of air flow through duct enlargements undertaken at the University. A progress report on this work has been submitted, and a Subcommittee

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*The asterisk after a committee member's name indicates he is also a member of the Committee on Research.

A meeting of the 1957 Committee on Research: (*l. to r.*) B. H. Jennings, director of research; E. S. Howarth, P. H. Yeomans, F. K. Hick, M.D., F. H. Faust, Miss Ilse M. Jahn, secretary; E. F. Snyder, Jr., vice chairman; H. A. Lockhart, chairman; Arthur Nutting, R. C. Chewning, H. R. Limbacher, W. S. Harris, D. D'Eustachio, R. C. Jordan

headed by Mr. Madison is investigating the matter for possible consideration as a cooperative project.

In addition to the subcommittees just mentioned the following are of particular interest:

1. The Subcommittee on Balancing of Air Distribution Systems has prepared a report containing a variety of far-reaching proposals which will soon be submitted to all members of the entire TAC for their consideration.
2. The subcommittee on Air Distribution Through Perforated Panels has considered a research proposal for further study of this subject, and will give its final decision in the very near future.

Important text changes made by the subcommittee on Guide Review have been incorporated in THE GUIDE 1958, Chapter 31 —Air Duct Design.

Combustion

H. R. Limbacher*, Chairman; A. A. Marks, Vice Chairman; K. T. Davis, R. B. Engdahl, H. G. Hays, W. B. Kirk, D. W. Locklin, W. A. Marshall, M. W. McRae, W. M. Myler, Jr., E. A. Norman, Jr., E. O. Olson, K. O. Schlentner, D. L. Wooden.

In 1957 the principal interest of the TAC on Combustion was in the research project on Oscillations and Pulsations in Oil and Gas Fired Domestic Heating Equipment, under the guidance of the Pulsation Research Steering Committee.

The solution of the problem of pulsation and resonance in domestic heating equipment, and the determination of methods for eliminating or suppressing such oscillations, is being pursued at Battelle Memorial Institute. Studies indicate that the oscillations are basically of the standing-wave type, and that the principal parameters affecting oscillations are primary air-flow rate for gas furnaces and total air and type of nozzles used for oil furnaces.

A theory has been postulated on the driving mechanism for oscillation in residential gas furnaces equipped with multiple-port, ribbon, or slotted type burners. It is indicated that the general operating conditions leading to oscillations are a function of (*a*) the product of the natural frequency of the burner and the time lag of the burner flame, and (*b*) the ratio of the furnace frequency to the natural frequency of the burner. The extent to which these operating conditions favor oscillation is a function of the ratio of the acoustic driving input from primary combustion to the acoustic damping losses.

An experimental investigation was made to study the conditions under which acoustic interaction could take place between a residential furnace and the room in which it was placed. Methods have been outlined which will help in locating a furnace in a position that will give a low noise level.

Extensive experimental tests are being conducted to determine the required data to complete the theories on the mechanism of oscillation in oil- and gas-fired furnaces, and methods of suppression of such oscillations.

Two technical papers on pulsation and resonance were presented at Society Meetings in 1957. One was on the program of the 63rd Annual Meeting, Chicago, February 1957, and the other was on the program at the Semi-Annual Meeting, Murray Bay, June 1957. Additionally a paper on the present status of the research program on pulsations in oil-fired furnaces was presented by A. A. Putnam before the *OHI* Technical Division Symposium in Boston, Mass., on June 4, 1957.

A paper is in preparation on The Fundamentals of Generation of Pulsation in Residential Gas Furnaces With Multiple Port Burners.

Additional technical papers contemplated for preparation are:

1. Pulsation in Residential Heating Equipment Equipped with Single Port Gas Burners.
2. Theoretical Mechanism of Pulsation in Oil Flames.
3. Curing Pulsation in Gas Flames.
4. Curing Pulsation in Oil Flames.

The project is a joint venture of the *American Gas Association, Oil Heat Institute,* and the AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS it was inaugurated in May 1954, for a period of 3 years. In May 1957, the project was extended for one year. It is expected that it will terminate in May 1958.

Evaporative Cooling

Leo Hungerford, Chairman; R. S. Ash, D. R. Baker, S. F. Duncan, H. S. Dutcher, John Engalitcheff, Jr., Stuart Giles, A. J. Hess, C. F. Kayan, L. C. Pellegrini, C. W. Pollock, C. B. Rowe, W. T. Smith, J. R. Watt, R. M. Westcott.

The TAC on Evaporative Cooling met 3 times during the year, at the 63rd Annual Meeting in Chicago in February, at the time of the meeting of the Chapters Regional committee for Region 4 in Los Angeles on May 8, and at the Semi-Annual Meeting 1957 at Murray Bay. During the year, a draft of material on evaporative condensers was prepared for use in THE GUIDE. Similar material was also completed on cooling towers, and new text material on evaporative cooling and humidification is approaching completion.

Heat Pump

F. R. Ellenberger, Chairman; R. C. Chewning*, Vice Chairman; E. R. Ambrose, G. L. Biehn, Warren Cheatham, W. F. Friend, S. F. Graziano, G. C. Hall, R. C. Jordan*, C. F. Kayan, J. D. Kroeker, W. L. McGrath, W. E. Nanes, F. R. O'Brien, W. O. Stewart, J. R. Swanton, Jr.

One meeting of the committee was held in January.

Under the guidance of the Guide Committee, the TAC on the Heat Pump is preparing a new chapter on Heat Pumps for THE GUIDE 1959. Outlines have been constructed, individual outlines assigned to various sections, and some text has been completed. It is expected that a complete first draft will be available by the time of the 64th Annual Meeting, January 1958.

Two papers scheduled for presentation at the 64th Annual Meeting were arranged for by the TAC on the Heat Pump. They are the papers by C. P. Davis, Jr. and R. I. Lipper on Sun-Energy Assistance for Air-Type Heat Pumps, and the one by T. L. Etherington on A Dynamic Heat Storage System.

Heat Transfer Through Fenestration

R. W. McKinley, Chairman; R. C. Jordan*, Vice Chairman; W. J. Arner, T. C. Carson, E. W. Conover, R. B. Crepps, W. B. Ewing, J. E. Frazier, H. F. Kingsbury, J. B. Leavy, Manny Levine, E. C. Miles, Bruno Morabito, F. W. Mowrey, D. J. Vild, H. B. Vincent, O. F. Wenzler, C. J. Youngblood, Jr.

Since 1947 when the Solar Calorimeter at the Laboratory was first put into use, this unique equipment has been in almost constant use, particularly during the summer months. Fifteen important technical papers resulting from this work have already been published, and material for 2 new papers is currently being prepared. Most of the solar heat data currently in use in the field has resulted from these studies and cover such items as heat transfer through flat glass, double glass, plain and frosted or ribbed glass, glass blocks and skylights.

Shade screens and other slat-type shades have also been evaluated as solar heat barriers. The past summer was devoted to an evaluation of various standard types of canvas and metal awnings, and a first paper on heat gain through windows shaded by canvas awnings has already been prepared by N. Ozisik and L. F. Schutrum of the Laboratory staff, and should soon be available for Society presentation.

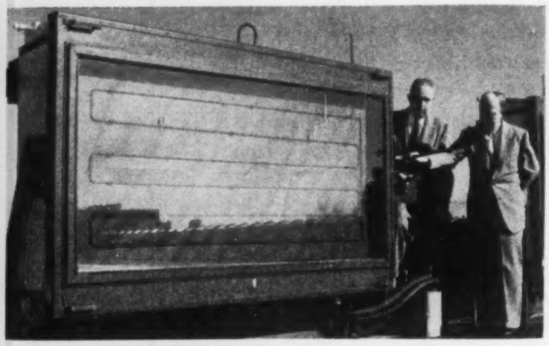
Future work for the calorimeter is in the planning stage, but roller shades as solar heat barriers are next scheduled for study to be evaluated as solar heat barriers under summer conditions and as radiation barriers under winter conditions. Slat-type shading devices between double glass will also be studied, and it is anticipated that a study of new plastic fenestrations, flat and corrugated reinforced, and in dome or bubble form will also be made.

Heating and Air Conditioning Loads

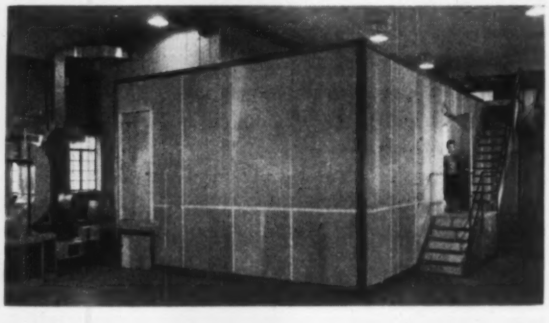
H. T. Gilkey, Chairman, P. H. Yeomans*, Vice Chairman — Air Conditioning Load Subcommittee: J. P. Stewart, Chairman; R. A. Gonzales, J. N. Livermore, C. O. Mackey, I. A. Naman — Heating Load Subcommittee: T. F. Rockwell, Chairman; P. R. Achenbach, R. T. Baum, Paul Gayman, G. R. Munger, W. R. Yeary — Infiltration Load Subcommittee: A. G. Wilson, Chairman; C. W. Coblentz, W. S. Harris,* A. M. Simpson, D. B. Turkington.

This committee is organized into subcommittees, with the chairman and vice chairman as ex-officio members of each subcommittee. This arrangement makes it possible to cover more effectively the broad fields of this advisory committee.

The entire Technical Advisory Committee met at the time of the 63rd Annual Meeting in Chicago. At that time, items of general inter-



Front view of solar energy collectors in use on the research at the University of Minnesota



Exterior view of partially completed environment test room with dehumidification equipment shown at left

est to the committee were discussed. In addition, the committee received a progress report from T. C. Min on field and laboratory studies of infiltration through building entrances. It also received a progress report from the University of Illinois on infiltration studies conducted in two residences. (Two papers which reported the results of this investigation were presented at the Semi-Annual Meeting 1957.)

On July 12, 1957, the subcommittee on Infiltration met at the Laboratory. The manuscript resulting from the research on infiltration through building entrances was reviewed and then was accepted by the subcommittee and recommended for publication. A proposal was also made that further research on infiltration through building entrances be conducted, with emphasis on summer conditions. It was also proposed that an investigation on air infiltration through revolving-door entrances be conducted.

The subcommittee on Heating Loads met on September 27, 1957, in the offices of T. F. Rockwell, Pittsburgh, Pa. The subcommittee recommended to the Guide Committee that the new weather data developed by H. C. S. Thom on winter design temperatures be incorporated in The Guide 1959, and that certain of these data be included in The Guide 1958. The subcommittee is planning to provide revised material relative to the use of these new data, and also to prepare new information on inside design temperatures.

Hot Water and Steam Heating

M. W. McRae, Chairman; R. C. Chewning*, Vice Chairman; G. F. Carlson, H. C. Day, W. S. Harris*, L. N. Hunter, John W. James, A T. Jones, D. L. Lindsay, J. D. Pierce, A. O. Roche, Jr., L. E. Seeley, Benjamin Spieth, M. H. Westerberg, N. E. Westphal.

An analytical study on the capacity and sizing of steam piping was completed by W. F. Kerka at the Laboratory. The study showed the values in The Guide to be somewhat overconservative in the smaller pipe sizes with much closer agreement in the larger sizes. Mr. Kerka's work was based on Moody-friction-factor approaches to the problem. However, the unknown effect of condensate in steam pipe lines, which introduces problems of two-phase flow, made it appear desirable to plan an experimental test program. It is believed this will be started early in 1958. This program will also include the analysis and testing of copper tubing for steam and condensate flow, particularly in the small pipe sizes. Some data on the heat transfer characteristics of tubing and pipe runs will also be determined.

Sizing of condensate receivers has been under study. Very little comprehensive material exists in the literature on this topic. However, contact with individuals has brought some data to light, and it is believed that a paper on this subject will soon appear in the engineering literature.

University of Illinois: Under the direction of W. S. Harris the investigation on the separation of dissolved gases from water in forced circulation hot-water heating systems has been completed. Further work at the University is planned with investigations to be made of vent-gas collection, particularly as related to the effects of chemical feed-water treatment and corrosive action in the system.

University of Florida: The project on the investigation of air lock and air entrainment in hot-water heating systems has been completed, and the final report received.

Northwestern University: The project on noise measurement and noise control in water flow systems has been inactive, with W. L. Rogers away from the University on leave. It is expected that work will be resumed on this project in early 1958. The metastable research has been completed, and the final report is in preparation.

Industrial Environment

K. E. Robinson, Chairman; Arthur Nutting*, Vice Chairman; A. D. Brandt, Lucien Brouha, F. N. Calhoon, K. J. Caplan, J. H. Clarke, R. B. Foley, A. S. Gates, Jr., T. F. Hatch, W. C. L. Hemeon, W. O. Huebner, Ernest Hungate, J. M. Kane, R. L. Kuehner, P. J. Marschall, Leslie Silverman, B. R. Small, R. P. Warren, H. E. Ziel

The TAC on Industrial Environment held 2 meetings during the year, the first at the 63rd Annual Meeting in February 1957, and the second at the Laboratory in September. The Committee has been working closely with the TAC on Physiological Research in giving guidance for the planning of the environment program at the Laboratory. The Committee has also been active in preparing new data for The Guide and in analyzing the material now contained in The Guide. The Committee strongly feels that the material in The Guide should be strengthened and brought together as a more unified whole, and toward this end chairmen have been appointed to head subcommittees set up to deal with important topics as follows: (1) *Process Aerodynamics* — W. C. L. Hemeon, Chairman; (2) *Building Structures* — H. E. Ziel, Chairman; (3) *Air Contaminants* — A. D. Brandt, Chairman; (4) *Controlled Air Supply* — J. H. Clarke, Chairman; and (5) *Industrial Exhaust Systems and Air Cleaning* — J. M. Kane and R. P. Warren, Co-Chairmen.

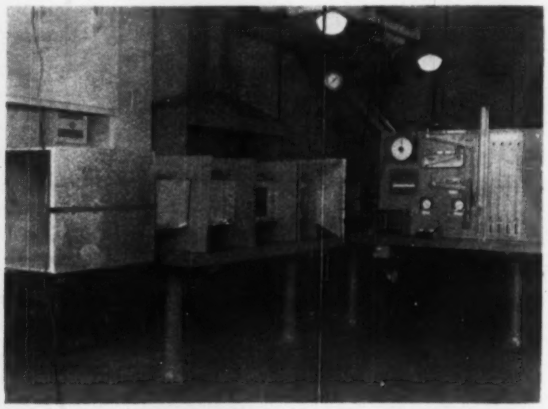
The Committee, in its realization that not enough material on industrial ventilation is appearing in the literature, is considering the idea of arranging a number of articles for possible use in the technical press. In all, the Committee is considering such papers on possibly 10 topics.

Insulation

M. W. Keyes, Chairman; N. B. Hutcheon*, Vice Chairman; G. E. Anderson, J. M. Barnhart, L. A. Barron, W. J. Binder, C. B. Bradley, H. C. Brown, Jr., P. D. Close, R. B. Crepps, G. A. Erickson, R. H. Heilman, F. A. Joy, W. A. Knudson, H. E. Lewis, W. J. Marshall, R. J. O'Heir, F. E. Parsons, E. L. Perrine, K. M. Ritchie, H. E. Robinson, Laurence Shuman, R. K. Thulman, William Turbeville, W. C. Turner.

The TAC on Insulation has completed work on recommendations for two chapters in The Guide, Chapter 9 on Heat Transmission Coefficients

View in ASHAE odor test room showing syringe-sample technique for establishing odor thresholds



The air-cleaner test apparatus employed at the University of Minnesota, showing the distribution chamber test duct and panel board of the system

of Building Materials (complete revision); and Chapter 27 on Pipe and Industrial Insulation (complete revision). Follow-up work in connection with these chapters as well as Chapter 10 on Moisture in Building Construction has been done.

New work, which is being undertaken, involves:

1. Preparation of suggested material for a new chapter on *Good Practice Recommendations for Insulation.*
2. Establishment of task forces in specific fields which will work towards inauguration of research on other projects such as:

(*a*) Study of attic and crawl space ventilation, air and surface temperatures, and related conditions, so that their effect on heat transmission coefficient of building sections and on the control of condensation can be evaluated. This study should include both summer and winter conditions.

(*b*) Recommendations for heat and moisture control for slab-on-grade construction.

(*c*) Moisture in insulated built-up roofs; effect of moisture on thermal conductivity.

(*d*) Loose-fill insulations, including sprayed-on and foamed-in-place insulations.

Odors

A. B. Hubbard, Chairman; J. I. Trimble*, Vice Chairman; H. L. Barnebey, C. J. D'Angio, Nicholas Deininger, A. H. Gee, R. E. Gould, C. F. Kayan, R. L. Kuehner, Lawrence Macrow, P. J. Messer, Sherman Ross, S. B. Smith, L. A. Staebler, R. D. Touton, Amos Turk, T. H. Urdahl, Warren Viessman.

Apparatus and a method of precisely odorizing fabric samples has now been developed. A *loading* tank can be kept at a constant level of any selected liquid odorant and at a constant temperature and humidity. The rate of odorant release from fabric samples has been determined by a dilution method in which rows of clean bottles are odorized by successively smaller fabric samples until one is found which results in threshold odor in a bottle. Rows of bottles are loaded with samples which have been aired under controlled conditions for successively longer times. Several pitfalls of the bottle method have been recognized and reasonable safeguards have been worked out. For instance, a cleaning method is now available to avoid residual bottle odor.

It has been found that fabric samples lose odor rapidly for a few minutes, moderately fast for a few hours, and then slowly for many hours. The three distinct time constants can be explained by analogy. If water loss were being measured, starting with samples taken from liquid: — weight loss would be rapid as water held in the weave dripped out; weight loss would next be less rapid as fiber surfaces dried; and then would settle to a slow rate as moisture worked it way out of fiber interiors.

An alternative method of measuring fabric odor level is now being evaluated. It is also based on dilution to threshold but uses syringes to produce trial mixes of odorless and sample air while the operator determines threshold proportions.

A subcommittee is studying the possible application of gas chromatography to this problem. This is an attempt to anticipate difficulties with odor blends. Samples can be expected to release individual odors at different rates, rendering the bottle or syringe method nearly useless.

Physiological Research

M. K. Fahnestock, Chairman; F. K. Hick*, M.D., Vice Chairman; P. R. Achenbach, Thomas Bedford, H. S. Belding, Lucien Brouha, A. C. Burton, R. E. Gould, L. N. Hunter, N. B. Hutcheon*, John W. James, R. L. Kuehner, P. J. Marschall, R. G. Nevins, L. J. Pecora, W. J. Radle, W. C. Randall, Sid Robinson, Frederick Sargent, II, E. F. Snyder, Jr.*, C. L. Taylor, C. P. Yaglou.

Sensations of Comfort

C. S. Leopold, Chairman; J. I. Trimble*, Vice Chairman; Lester T. Avery, John Everetts, Jr., M. K. Fahnestock, A. J. Hess.

Activities of these 2 technical advisory committees are so closely related in connection with the planning of the Environment Test Room that a common report for the 2 committees is presented.

In 1956 activity and planning for a complete rebuilding of the Environment Test Room were started, and this rebuilding is approaching completion. It is expected that the Test Room will go into use with human subjects in early 1958. The Environment Test Room 12 ft × 24.5 ft is arranged for carrying out the subjective testing, using 6 to 10 subjects at a given time. Temperature, humidity, air motion, along with radiant wall temperatures, can be varied in the room over a wide range of conditions. The environment center is also provided with 2 pre-test rooms in which the subjects can be acclimatized to specified equilibrium conditions before they enter the Environment Room. An observation room is also provided for the operating staff.

The project will be conducted as a series of programs essentially as prepared with the cooperation of the technical advisory committees by Nathaniel Glickman, consulting physiologist on the project.

***Program I. Influence of the Thermal Environment on the Comfort of Sedentary Workers.* This program will be carried out first, primarily to re-evaluate certain of the data and values and their relative allocation on the comfort chart of the Society.**

***Program II* will extend the objectives of Program I and introduce variations of radiant wall temperatures, so that the effect of symmetrical as well as asymmetrical radiation can be studied over wide variety of conditions.**

***Program III. Optimum Conditions for Comfort at Different Levels of Work.* This program will endeavor to determine the desirable comfort ranges at varying work levels.**

***Program IV. Human Productivity or Occupational Efficiency.* This is one of the more difficult researches to carry out, as it will have to measure the effects of environment on productivity. It is thought to be axiomatic that an occupant in an uncomfortable environment not well adapted to his physiological needs will perform less effectively than a person in a more suitable environment.**

***Program V. The Comfort of School Children as Related to Learning Rates.* The nature of this study is obvious from its title.**

These several programs will necessarily take many years to complete. The end results can be extremely far reaching and of great significance.

Plant and Animal Husbandry

A. J. Hess, Chairman; F. K. Hick*, M.D., Vice Chairman; A. B. Algren, John Everetts, Jr., M. K. Fahnestock, H. A. Lockhart*, H. E. Ziel.

The TAC met twice during the year. A number of research projects that might profitably be pursued by the Society were considered, but it was realized that the literature is so widely scattered that a careful search of all related literature should be made as a first step in broadly planning a program of action. During the year the ASHAE Council approved the formation of a Joint Committee with the *American Society of Agricultural Engineers.* It is believed that the new Joint Committee might be very effective, first in correlating the available knowledge of this field, and second in helping plan directions in which research should be carried out.

Solar Energy Utilization

R. C. Jordan*, Chairman; M. L. Ghai, Vice Chairman; F. R. Ellenberger, H. C. Hottel, N. B. Hutcheon*, M. L. Khanna, G. O. G. Löf, C. O. Mackey, Gunnar Pleijel, Maria Telkes, J. L. Threlkeld, G. T. Ward, L. F. Yissar.

The TAC on Solar Energy Utilization met during the 63rd Annual Meeting in February 1957. Among other items which the committee considered was a proposal that a separate chapter on solar energy be prepared for The Guide. Another important activity of the committee during the past year has been the preparation of a summary article on Solar Energy Utilization for Heating, Cooling, Distillation, and Drying. This article was completed during the year and is expected to be available for presentation at the 1958 Semi-Annual Meeting. Arrangements have been completed with the help of the committee for the Topical Session on Solar Energy at the 64th Annual Meeting, January 1958.

University of Minnesota: Work is continuing at the University of Minnesota on the cooperative project on solar energy collectors. Data on the amount of heat absorbed, type of radiation and transmittance of single and double glass are being measured. This work will continue over a period of time. However, significant data have already been obtained.

Sorption

G. L. Simpson, Chairman; E. S. Howarth*, Vice Chairman; G. C. F. Asker, H. L. Barnebey, L. S. Beeler, W. E. Emley, Jr., John Everetts, Jr., A. S. Gates, Jr., R. J. Getty, E. W. Gifford, R. R. Goll, T. E. Gravenstreter, Anthony Hass, R. H. Herrmann, C. F. Kayan, G. A. Kelley, E. R. McLaughlin, R. M. Milton, W. L. Ross; R. J. Zablodil.

The TAC on Sorption held 2 meetings during the year, one at the 63rd Annual Meeting, February 1957 and the second at the Semi-Annual Meeting at Murray Bay in June. The committee is actively following progress of its 2 research projects, and in addition is in process of developing a tentative standard, a *Proposed Method for Testing Sorption-Type Dehumidifiers.*

The Pennsylvania State University: The cooperative research project is being conducted on sterilization of air by solid sorbents.

University of Toledo: A cooperative research project is in progress on the sterilization of air by liquid sorbents.

As both of these cooperative projects have been under way for but a short time, comprehensive progress reports are not yet available.

Sound and Vibration Control

A. F. Hubbard, Chairman; D. D'Eustachio*, Vice Chairman; C. M. Ashley, Sidney Baker, J. B. Chaddock, R. N. Hammo, H. C. Hardy, John Harker, E. M. Herrmann, C. R. Hiers, Martin Hirschorn, F. B. Holgate, D. H. Krans, R. D. Lemmerman, R. D. Madison, R. E. Parker, G. J. Sanders, T. A. Walters, R. J. Wells.

The Committee is directing its activities through 3 subcommittees: (1) Subcommittee on Measurement of Sound-Power Level of a Fan, R. D. Madison, Chairman; (2) Subcommittee on Attenuation of Sound in Duct Systems, C. M. Ashley, Chairman; (3) Subcommittee on Review of Guide Chapter on Sound Control, J. B. Chaddock, Chairman.

Through frequent meetings the committee has been guiding the sound-study program at the Laboratory. The program has investigated four methods of determining the sound-power level of a fan.

At the Semi-Annual Meeting, Murray Bay, June 1957, the Committee gave its active support to the organization of a Symposium on Sound and Vibration. Ten papers on the subject were presented during the Symposium and at technical sessions.

A meeting of the subcommittee on Attenuation of Sound in Duct Systems was held to discuss the sound program now being conducted by the Research Laboratory and sponsored by the U. S. Navy, Bureau of Ships. The committee is offering assistance to the Laboratory in every way that it can be of service.

A meeting of the subcommittee on the Measurement of Sound-Power Level of a Fan was also held at Murray Bay to discuss proposed joint activities of the ASHAE and *ASRE* toward developing a standard for measuring the sound output of air-conditioning equipment. F. O. Urban, member of the *ASRE*, was present at the subcommittee meeting.

In February 1957 the Council authorized the Standards Committee of the Society to appoint representatives to a joint committee of ASHAE and *ASRE* on equipment noise testing. The three ASHAE members of the joint committee, Messrs. Ashley, Hubbard and Madison are all presently members of the TAC, while R. J. Wells, also a member of the TAC, is consultant to the joint committee.

The director of research has suggested that the TAC on Sound and Vibration Control and the Society consider the planning of an all-industry conference to discuss some of the sound-control problems confronting the air-conditioning industry. He points out that the committee members could serve as leaders in discussing topics of interest. He feels that no formal papers would be necessary. Besides industry participation, technical institutes and trade associations would also be included. It has been suggested that such a symposium might be held at the Laboratory either during the spring or fall of 1958.

Thermal Circuits

S. F. Gilman, Chairman; F. H. Faust*, Vice Chairman; P. A. Bourquin, W. R. Brisken, Harry Buchberg, N. R. Gay, C. F. Kayan, C B. Monk, Jr., L. W. Nelson, H. B. Nottage, K. R. Solvason, H. B. Vincent.

The thermal-circuit technique is a powerful analytical method of synthesizing the thermo-physical characteristics of building components into the performance of the structure as a whole. Pioneered by H. B. Nottage in 1954, this method was originally guided by the TAC on Cooling Loads. In 1956, the TAC on Thermal Circuits was formed to develop and validate methods of determining the behavior of complex thermal systems and to formulate application engineering data in cooperation with other TACs.

Ten ASHAE research papers have been presented to date in this field. In 1956, a Thermal Circuit analysis of a structure with a combined air and panel system was made by the Laboratory staff using an electronic differential analyzer to solve the circuit equations. As a part of a paper at the Semi-Annual Meeting in June, 1957, by S. F. Gilman and O. W. Clausen, this same problem was solved with a digital computer.

As a result of the continuing cooperative project with University of California at Los Angeles, H. A. Buchberg has prepared 2 papers, one of which is on the program at the 64th Annual Meeting, January 1958, and the other is expected to be available for the program at the Semi-Annual Meeting in June 1958.

The TAC has formulated, and recommended to the Committee on Research, a program of additional analytical and experimental work having the objective of eventually providing readily-usable design and application engineering data.

Weather Data

John Everetts, Jr., Chairman; R. C. Jordan*, Vice Chairman; James Bricker, D. T. Donovan, D. L. Fiske, J. B. Graham, W. L. Holladay, D. W. Lynch, W. J. Radle, W. T. Smith, H. C. S. Thom.

During the past year, the TAC on Weather Data has extended its studies in connection with summer dry-bulb and summer wet-bulb information. A similar study was completed by the Weather Data Committee on winter dry-bulb temperatures and presented to the Society in the form of a paper by H. C. S. Thom at the 63rd Annual Meeting January, 1957. These data were subsequently accepted by the TAC on Heating Loads for possible reproduction in THE GUIDE 1959.

The TAC also reviewed a paper prepared by W. L. Holladay, a member of the committee. This paper, entitled *Local Climatic Weather Data* is to be presented at the 64th Annual Meeting, Pittsburgh, January, 1958.

Additionally four papers will be given at the Pittsburgh Meeting at the Topical session on Solar Radiation headed by Dr. R. C. Jordan, a member of the Weather Data Committee.

Also during this past year, the TAC on Weather Data has made a preliminary investigation into the dry-bulb and wet-bulb data for summer. This preliminary investigation has shown some startling deviations from the existing data in THE GUIDE and will be the major subject of discussion at the TAC meeting in Pittsburgh scheduled during the 64th Annual Meeting in Pittsburgh. Members of the Committee have been most diligent in furnishing their suggestions, criticisms, and studies of the complex problems associated with these studies.

Improving Attic Space Insulating Values

By F. A. Joy*, University Park, Pa.

A BLACK roof top on a clear summer day can be expected to reach 150 F in any part of the United States[1]. The resulting peak heat flow into the house through the attic may determine the required capacity of air-conditioning equipment. To limit this heat load, attic insulation is an obvious need and as much as 6 in. of fibrous insulation has sometimes been recommended. Normally this is placed in the ceiling. Above it, the attic air space provides some insulating value and this value can be greatly increased by two devices: heat reflection and ventilation.

Purpose

Use of highly reflective sheet materials such as aluminum foil has long been recognized as a means of reducing radiant heat transfer but the special merit of such a sheet applied on the top of fibrous insulation in a ceiling attracted new attention following the publication of work done at the National Bureau of Standards in 1954[2]. That work was limited to simple air spaces not over 3½ in. across without joists or ventilation. For the deeper and more complex space provided by an attic and for the effect of ventilation, further research was necessary. This paper reports the results of tests on two attics, one with a flat roof and the other with a gable roof, each having 2 in. of fibrous insulation in the ceiling topped by aluminum foil, by reflective paper, and by kraft paper, with a wide range of attic ventilation.

SUMMARY—A small test house built in the laboratory provided an attic with flat or gable roof and attic ventilation. A highly reflective *breather* sheet covering the fibrous insulation between ceiling joists contributed to an important reduction in the summer cooling load. The effective insulating value of the attic in summer and winter is derived.

Basic Methods

To secure realistic data, generally applicable to attic problems, the following basic methods were adopted:

1. The work was done in the laboratory under controlled, steady-state conditions rather than the transient conditions of weather exposure.
2. The attic was as large as feasible, and the perimeter heat losses were eliminated so that the results are applicable to an attic of large size.
3. The roofing temperature was 150 F, representative of full-sun summer conditions.
4. Ventilation at a controlled temperature was steady and metered. Air flow under the flat roof was parallel to the roof and ceiling joists, entering and leaving through slots at a low level. Air flow under the gable roof was across the roof and ceiling joists, entering and leaving through ports high in the gables.
5. The measured heat flow was the overall heat flow actually entering the living space through the ceiling, including the area under joists as well as that under insulation. Large heat-flow meters were made for this purpose.
6. The breather sheets, kraft, foil and reflective paper, placed on the top of the fibrous insulation, were exchangeable without moving this insulation.

Test Equipment

The Test House (Fig. 1) is 12 × 13 ft inside with 8-ft ceiling height, built within a room 19 ft square with 14-ft ceiling. With a hinged and counter-balanced top, this house provides either a flat or a gable roof. All joints are gasketed for air tightness.

The roof deck is ¾-in. plywood on 2 × 6 fir rafters placed on 16-in. centers. Completely covering the deck are 2 layers of ⅛-in. cement-asbestos board, the top layer consisting of 6 sheets wound with heater wire closely spaced to provide uniform heating. These heaters are covered by 4 in. of glass fiber semi-rigid board-type insulation in 2 layers to restrict and equalize upward heat loss over the roof area. (These losses are not a part of the measurement, however.)

Each half of the deck has separate temperature control. The voltage on each heater is manually adjusted 5 percent higher than required and a 10 percent voltage correction is under automatic control. Each temperature controller uses a resistance element of fine nickel wire wound in a 6 sq ft grid on top of the plywood deck in the central area. Close control is readily maintained since the test house is built in a controlled temperature room.

To minimize edge effects and thus insure data applicable to a much larger house, all vertical walls of the attic are *guarded* by heaters near their interior surfaces. Closely applied to the heaters and separating them from the attic space is a ½-in. thickness of insulating board faced with aluminum foil. Thermocouples on opposite sides of this board are substantially equalized by manual adjustment of the heaters.

The ceiling has 2 × 6 joists (16-in. spacing) on which 2 layers of ⅜-in. gypsum board were applied after a sheet of vapor barrier paper was stapled in place. Inlaid in the top layer are 4 heat-flow meters which are described hereafter. The bottom layer is primarily a device to shield the meters from air drafts and to in-

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*Professor of Engineering Research, The Pennsylvania State University. Member of ASHAE.

[1] Exponent numerals refer to References.

For presentation at the 64th Annual Meeting of the AMERICAN SOCIETY OF HEATING AND AIR CONDITIONING ENGINEERS, Pittsburgh, Pa., January 1958.

sure that the ceiling is substantially airtight. The thermal value of the 2 sheets of gypsum board is comparable to a typical plastered ceiling with lightweight aggregate.

Fitted between the ceiling joists in contact with the vapor barrier are 2-in. sheets of semi-rigid glass fiber insulation having 9 lb per cu ft density. This insulation, while not typical in this application, was chosen because of its uniform thermal value and its resistance to change by accidental crushing during the progress of the work. On top of this insulation the breather sheet is placed, the following types being tested:

1. Kraft paper; 9 lb per 500 sq ft.
2. Perforated aluminum foil with kraft backing (breather type, having 64 perforations per sq in. and permeance of 40-60 perms) installed with the foil side up.
3. Reflective paper; emissivity = 0.2.

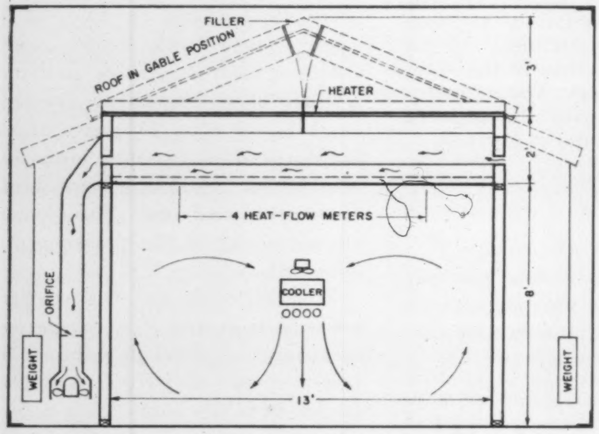


Fig. 1 — Test house in controlled room

Within the test house, a brine cooled heat exchanger is placed in the center of the space. Air is blown downward by a 12-in. fan through the exchanger and immediately tempered by a bank of heating lamps. The air entrance and leaving temperatures are both measured by grids of resistance wire which act through an electronic controller to adjust the heater voltage and maintain a steady room temperature of 75 F (at mid-height). These arrangements provide low air velocity not exceeding 20 fpm 1 ft below the ceiling. A continuous record of the room temperature provided by a hygrothermograph is supplementary to thermocouple measurements taken at mid-height of the room.

Outside the test house, the temperature is controlled for general steadiness of operation and for ventilation air control.

Ventilation is provided by an exhaust fan of ample capacity. For the flat roof, air enters the attic through a 1½-in. slot running the full 12-ft width of the attic just above the ceiling joists. A cowl over the opening to obtain a more uniform inlet temperature is provided. At the outlet from the attic, the ventilation air passes through a ⅜-in. accurately adjusted slot to insure uniform air movement over the whole attic area. From the plenum beyond the slot, it passes through a straight pipe to the measuring orifice and thence to the exhaust fan.

For the gable roof, the air enters through a typical commercial louver installed in the peak after passing up through a large duct to equalize its temperature. It leaves through a horizontal ¾-in. slot 36 in. long near the peak of the opposite gable. The air flow is across the joists. The heat-flow meters were in the same positions in both flat roof and gable roof tests.

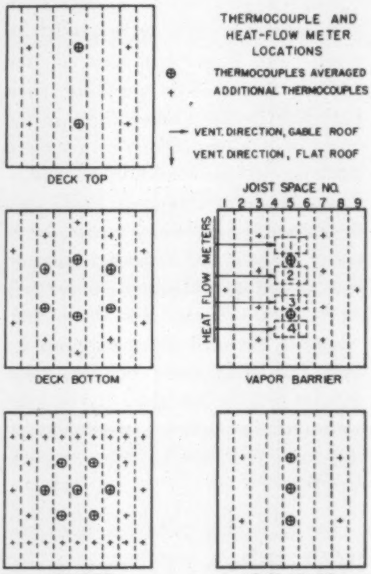


Fig. 2 — Thermocouple and heat-flow meter locations

Temperature Measurements: The inlet temperature of ventilating air is obtained by 3 thermocouples placed ahead of the entrance. The outlet temperature is obtained by 3 thermocouples mounted in sturdy air foils of bright aluminum mounted within and across the outlet approach where they serve to average the tempera-

Table 1 — Heat-flow meter factors

Meter No.		1	2	3	4
Meter Factor at 86 F		0.6720	0.6225	0.6502	0.6122
Calibration Tests No.		C and D		A and B	
Glass fiber boards *k*-value (found with above meter factors)					
	Test No.	C	D	A	B
Top board at 112 F Mean	Meter No. *k*-value	1 0.271	2 0.273	3 0.269	4 0.273
Bottom board at 113 F Mean	Meter No. *k*-value	2 0.265	1 0.266	4 0.263	3 0.266

ture of the outflowing air that is likely to be stratified.

Thermocouples in at least 100 locations provide a comprehensive knowledge of temperatures and operating conditions. All temperatures are recorded by a self-balancing potentiometer. A constant check of these recordings is provided by one thermocouple in ice. The locations of thermocouples in primary planes are shown in Fig. 2. In addition, an array is provided in the attic space to indicate stratification and air flow patterns. Four thermocouples are inserted into the ceiling joists at the breather level for detailed analysis of the heat distribution between insulation and joists.

Heat-Flow Meters: An essential feature of the test method is the heat-flow measurement. Four heat-flow meters are used. Each meter is a sheet of dry gypsum board 20 × 36 × ⅜-in. thick on which a thermopile system containing 128 pairs of junctions is wound to cover the central area, 16 × 32 in., as shown in Fig. 3. The gypsum board was first oven dried and then painted with 2 coats of a vapor resisting paint. Copper-constantan thermocouples using #30 wire were wound in the positions shown with all wires carried around the edges — not through the meter. The meter was again oven dried and then sealed in 10-mil polyethylene adhered to the surfaces with a double faced pressure sensitive film.

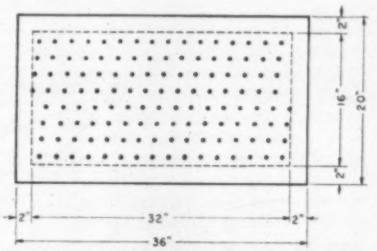


Fig. 3 — Heat-flow meter showing thermocouple junctions

As placed in the ceiling, (Fig. 2), the long dimension of a meter spans the middle (fifth) joist-space with the metered area extending from the middle of the fourth to the middle of the sixth joist-space, insuring a true composite of the total heat flow pattern under joists and insulation. The total metering area of the 4 meters is 14.2 sq ft or 9 percent of the ceiling area. The arrangement shown in Fig. 2, in the line of air flow under the flat roof, provides a good average for the ceiling area. The emf of each meter is obtained by potentiometer, manually operated.

The heat-flow meters were calibrated in a large hot plate having 32 sq ft of heater area. With the plate horizontal, 2 meters were calibrated at the same time in a 2-step procedure. One meter was placed above and the other below the heater, each separated therefrom by a sheet of high density semi-rigid glass fiber board and covered on its cold side by gypsum board. These contact materials are the same as in the test house, thus avoiding a metering question that is sometimes troublesome. The a-c heater power was measured with a watt-hour standard meter and the division of heat between the 2 meters was determined

Table 2 — Summary of flat roof tests

Test No.	Breather	Ventilation				Center Zone Average Temperatures, Fahrenheit						Heat Flow, Btu/sq ft, hr					Cor. to Std.,[a] Btu	Attic Effect. Res.,[b] Ru
		Air in F	Air out F	Air Flow cfm	Rate cfm per sq ft	Roof Top	Deck Bottom	Breather	Vapor Barrier	Ceiling	Room	Meter No. 1	Meter No. 2	Meter No. 3	Meter No. 4	Avg		
1	Kraft	——	——	0	0	149.9	140.9	133.1	89.6	83.8	74.9	5.903	5.997	5.951	5.992	5.961	5.96	2.6
2	Kraft	84.6	121.9	31	0.20	149.7	134.7	122.1	87.6	82.8	76.5	4.430	——	4.870	5.153	(4.776)	4.94	5.2
3	Kraft	85.8	113.4	72	0.46	150.2	132.7	116.4	86.7	82.5	75.7	3.725	4.029	4.234	4.412	4.100	4.12	8.2
4	Kraft	85.4	101.5	162	1.04	149.6	128.6	110.3	85.6	82.0	75.9	3.067	3.309	3.414	——	(3.310)	3.38	12.2
5	Kraft	94.9	108.1	162	1.04	149.9	131.9	116.0	87.8	83.8	74.9	3.565	3.808	3.826	3.910	3.777	3.78	9.8
6	Kraft	104.0	126.9	31	0.20	151.2	138.5	127.7	89.1	84.0	76.8	5.153	——	5.417	5.690	(5.386)	5.53	3.6
7	Kraft	105.2	115.3	162	1.04	150.8	135.1	121.4	88.8	83.8	75.5	4.210	4.432	4.422	4.479	4.436	4.44	6.9
8	Perforated[c] Alum. Foil	——	——	0	0	149.6	142.4	113.3	85.9	82.0	75.3	4.224	4.336	4.275	4.359	4.299	4.34	7.3
9	Perforated Alum. Foil	86.0	119.3	31	0.20	150.6	138.9	101.6	83.9	81.7	76.8	2.594	2.859	2.959	3.125	2.884	2.94	15.5
10	Perforated Alum. Foil	85.4	106.4	72	0.46	149.9	135.7	94.1	81.8	80.0	75.3	1.843	2.109	2.236	2.323	2.128	2.13	25.2
11	Perforated Alum. Foil	84.3	95.8	162	1.04	149.9	133.9	91.2	82.0	81.1	74.7	1.512	1.777	1.791	1.811	1.722	1.75	32.8
12	Perforated Alum. Foil	95.1	105.3	162	1.04	150.8	137.5	98.5	84.1	83.1	75.7	2.237	2.480	2.437	2.449	2.410	2.45	20.6
13	Perforated Alum. Foil	104.1	123.7	31	0.20	149.8	140.1	107.6	84.7	82.3	76.4	3.449	3.615	3.594	3.707	3.591	3.74	10.0
14	Perforated Alum. Foil	105.2	117.4	72	0.46	149.8	138.6	106.8	84.1	80.9	74.4	3.398	3.522	3.495	3.539	3.488	3.43	11.8
15	Perforated Alum. Foil	105.1	113.0	162	1.04	150.6	138.9	106.5	85.2	82.7	74.3	3.217	3.386	3.294	3.295	3.298	3.22	13.3
16	Reflective Paper	84.5	110.3	72	0.46	151.1	135.3	106.1	84.1	81.5	76.2	2.871	3.154	3.272	3.476	3.193	3.29	12.8
								Winter Conditions										
31	Perforated Alum. Foil	——	——	0	0	7.8	13.5	27.5	67.4	71.3	75.0	5.025	5.040	5.080	5.106	5.063	5.65	3.3
32	Alum. Foil	−2.0	5.3	87	0.56	1.4	3.0	11.3	65.0	70.0	74.5	6.392	6.456	6.444	6.457	6.437	6.46	1.6

[a]Corrected to standard conditions. [b]Attic effective resistance, Ru. [c]Perforated for breather application.

by reversing their position in the second step, assuming that the ratio of conductances of the upper and lower glass fiber boards was the same in each test. The conductivity of each board was not required though it was incidentally determined and as it provides a check of the calibration, it is reported with the meter factors in Table 1.

Test Procedure

In operation, the controlled conditions are maintained constant and the heat-flow meters are read periodically while a steady state is being established. This may require one day or a week. Moisture effects slow up the operation. To minimize these effects, the roof is continuously heated. When heat-flows and temperatures taken at 20 min intervals over a 6-hr period show no drift, the test is considered satisfactory.

Test Data

A summary of the results of all flat roof tests is presented in Table 2. The summary of gable roof tests is presented in Table 3. In these tabulations, the average temperature at each major plane of the construction includes only those in the central zone — the circled points in Fig. 2. Outside this zone, the temperatures were not much different, but they are omitted from the average for greater refinement.

Analysis of Summer Heat Gain Tests

The heat flow measured by each meter is listed in the tables and its position is shown in Fig. 2. After averaging all meters, the heat flow is corrected to standard conditions: 150 F roof top; 75 F room; and 85 F, 95 F or 105 F ventilating air. Evidence of good reproducibility is shown in Tests No. 29 and No. 30, not consecutively run. The corrected heat flows are plotted in Fig. 4 against ventilation rate expressed as cfm per sq ft (of ceiling area).

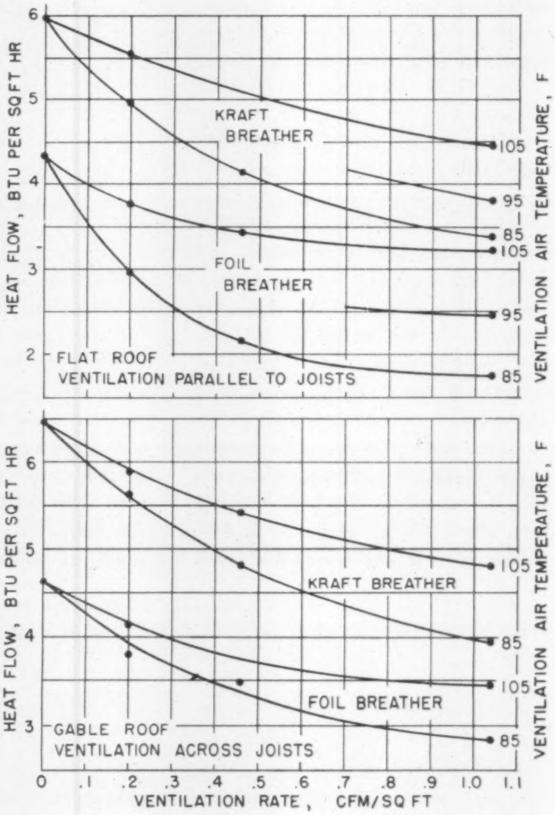
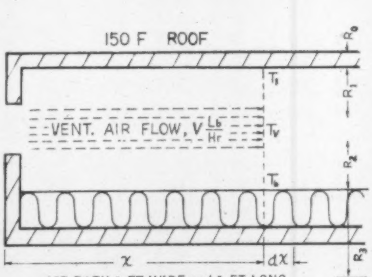


Fig. 4 — Heat flow through ceiling in summer

Application of these data to a house larger than the one tested merits consideration. The simplest enlargement is imagined by placing 2 attics (like that tested) side by side with cross ventilation doubled in volume. The ventilating rate expressed in cfm per sq ft is the same, and the heat inflow obviously will be the same in the second house. Therefore, Fig. 4 applies correctly to any attic where the air path is 13 ft long.



AIR PATH 1 FT WIDE and 1 FT LONG
Fig. 5 — Attic section

Considering the same 2 attics ventilated the long way, in a 26-ft path, the application of Fig. 4 is less clear. However, if the temperature of the air entering the second attic is taken as it is discharged from the first, the heat flow for each is obtainable from Fig. 4 and these results may be averaged for the whole ceiling. Continuing in the same way, the results for 3 or more attics can be combined. Applying this step-by-step procedure, the data indicate that Fig. 4 is properly applicable to longer air paths.

To confirm this conclusion, a mathematical analysis is readily made if certain simplifying assumptions are allowed. Provided the surface coefficient of heat transfer on the deck bottom and breather top are constant within the range considered, the heat balance in Fig. 5 may be developed as shown in Fig. 6.

In Equation 1, it is evident that Q_{avg} is constant when V/L is chosen, demonstrating that Fig. 4 is valid for any length of air path.

The assumptions are reasonable if the entering and leaving velocities are held constant by adjusting the port size in proportion to the ceiling area which is good practice. With an attic height as tested, it appears that Fig. 4 may be used without serious error for any air path up to 40 ft long.

Exact computations for an attic of different height or roof slope cannot be made directly from the basic data. However, it is evident that the position, size and shape of the air entrance and exit ports may have a very important effect on the value of ventilating air. These factors were optimum in the flat roof design. They were very unfavorable in the gable roof.

Perimeter heat losses were carefully avoided in the tests so that the data could be applied to a larger house. If the attic wall area is large and uninsulated, the heat loss from the attic to the weather merits attention, but its net effect is not simply stated.

$$N(T_1-T_b)dx+\left(\frac{T_1-T_v}{R_1}\right)dx=(150-T_1)\frac{dx}{R_0}$$

$$N(T_1-T_b)dx-\left(\frac{T_b-T_v}{R_2}\right)dx=(T_b-75)\frac{dx}{R_3}$$

$$(T_b-75)\frac{dx}{R_3}+CV\,dT=(150-T_1)\frac{dx}{R_0}$$

where the temperatures (T) and thermal resistances (R) are as indicated in Fig. 5. In addition:

dT = Small temperature rise (F deg) of ventilating air as it passes over the increment, dx.

C = Specific heat of air, Btu/(lb)(F deg)

N = radiation coefficient between roof bottom and the breather (approximately constant for this purpose), Btu/(sq ft)(hr)(F deg).

Eliminating T_1 and T_v from the heat balance equation, gives:

$$T_b=K_0+K_1e^{-\frac{K_2}{V}x},\quad \text{where}$$

K_0, K_1 and K_2 are constants including C, N, R_0, R_1, R_2, and R_3.

Total heat flow into the house along the full path, L, is written as:

$$Q_L=\int_0^L\left(\frac{T_b-75}{R_3}\right)dx$$

$$=\frac{1}{R_3}\int_0^L\left[\left(K_0+K_1e^{-\frac{K_2}{V}x}\right)-75\right]dx$$

Integrating and dividing by L gives the average heat flow Q_{av}, as:

$$Q_{av}=\frac{1}{R_3}\left[(K_0-75)+\frac{K_1}{K_2}\left(\frac{V}{L}\right)\left\{1-e^{-K_2\left(\frac{L}{V}\right)}\right\}\right]\text{-----}(1)$$

Fig. 6 — Mathematical analysis of heat balance in Fig. 5

Winter Heat Loss Tests

To complete the program, four tests were run under winter conditions holding the temperature at zero F in the space surrounding the test house. For this purpose, all insulation was removed from the roof top but the cement-asbestos sheets remained (unheated). The insulation in the wall areas of the attic remained but the *guard heaters* were idle. Inside the house, heating and air circulation as in the summer tests were provided.

Moderate ventilation was supplied in 2 tests. Attic ventilation is unwanted in winter, but a small amount is required to avoid condensation of moisture coming from the occupied space. For this purpose, certain vent areas have been recommended[3] with natural ventilation. The ventilation rate varies with wind but it is believed that the tested rate — 0.56 cfm per sq ft — exceeds normal in most locations. The winter results are pre-

Table 3 — Summary of gable roof tests

Test No.	Breather	Ventilation				Center Zone Average Temperatures Fahrenheit						Heat Flow, Btu/sq ft, hr					Corr. to Std.,[a] Btu	Attic Effect. Res.,[b] Ru
		Air in F	Air out F	Air Flow cfm	Rate cfm per sq ft	Roof Top	Deck Bottom	Breather	Vapor Barrier	Ceiling	Room	Meter No. 1	Meter No. 2	Meter No. 3	Meter No. 4	Avg		
17	Kraft	——	——	0	0	149.8	141.8	133.5	89.0	83.8	75.5	6.294	6.375	6.488	6.371	6.382	6.44	1.6
18	Kraft	86.5	129.0	31	0.20	149.9	137.1	126.3	86.6	81.4	74.7	5.518	5.730	5.814	5.537	5.650	5.60	3.4
19	Kraft	84.7	120.4	72	0.46	150.4	132.4	119.1	85.8	82.0	75.8	4.687	4,745	4.765	4.630	4.707	4.76	5.7
20	Kraft	84.5	106.0	162	1.04	149.8	127.2	112.2	84.7	81.5	75.8	3.793	3.852	3.882	3.782	3.827	3.93	9.1
21	Kraft	106.8	130.9	31	0.20	150.2	138.9	129.1	88.7	83.9	75.6	5.802	5.862	5.924	5.797	5.846	5.86	2.8
22	Kraft	105.4	126.3	72	0.46	150.1	135.8	125.0	87.2	82.7	75.0	5.377	5.412	5.490	5.399	5.420	5.40	3.9
23	Kraft	106.1	120.2	162	1.04	150.8	132.6	121.0	86.9	83.3	76.3	4.719	4.786	4.861	4.715	4.770	4.80	5.6
24	Perforated[c] Alum. Foil	——	——	0	0	149.4	142.3	115.1	85.4	82.8	75.7	4.373	4.588	4.616	4.611	4.547	4.63	6.2
25	Perforated Alum. Foil	86.4	132.6	31	0.20	150.9	139.1	109.5	84.1	81.5	75.4	3.731	3.853	3.787	3.951	3.830	3.79	9.7
26	Perforated Alum. Foil	84.2	123.2	72	0.46	150.3	134.3	107.6	83.9	80.6	75.2	3.232	3.539	3.533	3.573	3.469	3.49	11.5
27	Perforated Alum. Foil	84.7	109.9	162	1.04	148.8	128.6	99.3	81.3	78.6	74.5	2.545	2.883	2.982	2.737	2.787	2.80	16.8
28	Perforated Alum. Foil	106.3	130.0	31	0.20	149.9	139.4	110.8	83.6	80.4	75.2	4.123	4.248	4.276	4.134	4.195	4.19	7.9
29	Perforated Alum. Foil	105.9	118.8	162	1.04	150.5	133.7	105.9	83.6	80.8	75.3	3.124	3.436	3.752	3.423	3.434	3.41	12.0
30	Perforated Alum. Foil	105.8	118.8	162	1.04	150.2	133.5	105.9	82.8	80.3	75.3	3.125	3.424	3.762	3.454	3.441	3.43	11.9
									Winter Conditions									
33	Perforated Alum. Foil	——	——	0	0	5.1	10.9	25.6	66.9	71.3	74.6	5.223	5.304	5.252	5.201	5.270	5.69	3.2
34	Alum. Foil	−0.3	8.0	87	0.56	2.4	5.2	16.5	65.6	70.6	74.3	6.048	6.154	6.112	6.089	6.101	6.27	1.9

[a]Corrected to standard conditions. [b]Attic effective resistance, Ru. [c]Perforated for breather application.

sented in Tables 2 and 3 including the heat loss corrected to standard conditions: 75 F room with 0 F roof top and ventilating air.

Value of the Attic

The temperatures recorded for the summer tests in Tables 2 and 3 show clearly that the breather is always much cooler than the roof top, the difference indicating the insulating value of the attic. To present this observation in organized form, it is possible to compute the thermal resistance of the attic in the usual way, the heat flow and temperature difference being known. When there is attic ventilation, the result may be called *effective resistance* though its application is the same.

Actually, the breather temperature should be modified to include the effect of the ceiling joists which have a different temperature and are indeed an important heat path by-passing the insulation when it is covered by aluminum foil but the joists are not. An expedient is to calculate the *U*-value for the ceiling, including joists, by accepted methods[4] and then subtract its resistance ($1/U$) from the tested resistance of the structure. The remainder is the resistance in the heat path from roof top to the *effective top* of the ceiling unit in air near the breather.

For the ceiling unit here reported, the calculation of the *U*-value (using test data where available) is as follows:

	Resistance
Insulation: 1.98 in. thick, k=0.265	7.48 ru[a]
Two sheets gypsum board	0.64
Surface above (still air)	0.92
Air below (from test data)	1.50
Total	10.54 ru[a]

The usual correction for joists treats them as parallel heat-flow paths. The observed temperature within joists at the breather level averaged 10.4 F lower than the breather temperature in Tests No. 1 and No. 17, without ventilation. Consequently, the depth of joist to be considered in this assembly is 2.8 in. (the depth of insulation plus one half the joist width). On this basis, the *U*-value correction for joists is 1.06 and the calculated ceiling resistance ($1/U$) with non-reflective breather is 10.0 ru.

The effective resistance of the attic in each test is found by subtracting 10.0 ru from the overall resistance of the structure since the ceiling was always the same except the breather. Any effect of a highly reflective breather is properly credited to the air space above it and not to the elements it touches. The procedure outlined gives the credit where it belongs — to the attic. The effective resistance of the attic is shown in Tables 2 and 3 and in Figs. 7 and 8.

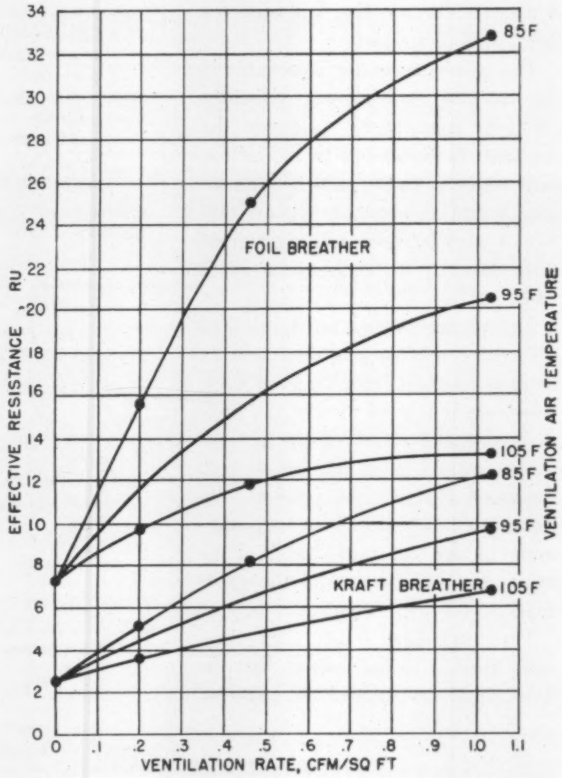


Fig. 7 — Effective resistance of attic. Flat roof in summer

For the winter tests, the attic resistance is 3.3 ru under the flat roof and 3.2 ru under the gable roof, both having aluminum foil breathers and no ventilation. The breather value is less in winter with upward heat flow. Ventilation lowers the effective resistance and should be held to proper limits. These winter results are included in the tables.

Under summer conditions, Test No. 17 shows that the basic resistance of the gable attic (with kraft breather and no ventilation) is 1.6 ru. An aluminum foil breather and maximum ventilation at 85 F increases the attic value to 16.8 ru, the addition being comparable to 4 in. of insulation. Higher ventilation temperatures are less favorable.

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[a] *Resistance unit,* abbreviated to ru, is 1 (hr) (sq ft) (F deg) per Btu and is here proposed as a convenient name for this unit since the longer description is awkward. Being awkward and lacking physical significance to many people, the unit is unnamed in a recent publication though resistance and conductance are its subject[5]. The short name is used herein.

With the flat roof (Fig. 7) the effective resistance of the attic rises sharply with 85 F ventilation, especially when the breather is aluminum foil. This appears to be due to laminar flow of the ventilating air with a high degree of stratification in the attic space. This result is accomplished by placing the inlet and outlet low (just above the ceiling joists) with low entering velocity through a slot extending the full width of the ceiling. It may be noted that even more attic resistance could be obtained by covering the exposed joist tops with reflective material.

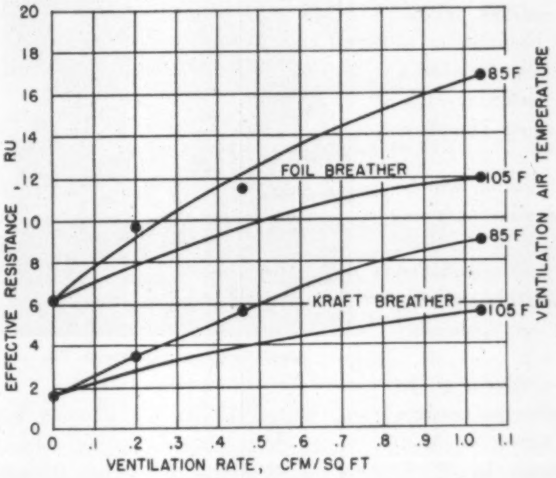


Fig. 8 — Effective resistance of attic. Gable roof in summer

Under all conditions, the gable attic has lower resistance than the flat roof design. With no ventilation this difference is traceable primarily to the reduced effect of joists blocking direct radiation. Convection of air is also encouraged by the wedge shape of the space and the roof surface per square foot of ceiling is increased. But the lower effectiveness of ventilation is due primarily to the air path which is distinctly unfavorable in the gable attic.

With the practical problems of design and construction it may not be feasible to secure all the added insulating values shown in the flat roof tests, but it surely is feasible to attain those in the gable tests.

Acknowledgments

The work here reported was done in The Thermal Research Laboratory at The Pennsylvania State University under the sponsorship of the Aluminum Company of America. Mr. J. J. Zaborny did much of the test work with important contributions by other members of the laboratory staff.

References

1. Principles Affecting Insulated Built-up Roofs, by C. E. Lund and R. M. Granum (*Engineering Experiment Station Bulletin No.* 34, University of Minnesota, Minneapolis, Minn.).

2. The Thermal Insulative Value of Airspaces, Housing Research Paper 32 (U. S. Housing and Home Finance Agency, Washington, D.C.).

3. Condensation Control in Dwelling Construction (U. S. Housing and Home Finance Agency, 1950).

4. HEATING VENTILATING AND AIR CONDITIONING GUIDE, 1957, Chapter 9 — Heat Transmission Coefficients of Building Materials (published by AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS, New York, N.Y.)

5. Heat Loss Calculations, Technical Circular No. 7, Revised April 1956 (U. S. Federal Housing Administration, Washington, D.C.).

NOTICE TO ASHAE MEMBERS OF 64TH ANNUAL MEETING 1958

Please take notice that the 64th Annual Meeting of the AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS, INC. will take place in Pittsburgh, Pa. at the Penn-Sheraton Hotel, 9:00 a.m. on Monday, January 27, 1958.

The meeting will continue through Wednesday, January 29 and will consist of seven Technical Sessions at which reports of the Officers and Committees will be given, also 17 technical papers will be presented and two Symposiums are scheduled, one on High Temperature Water and the other on School Heating, Ventilating and Air Conditioning (See Program p. 231).

The purpose of the meeting is to amend the By-Laws, to elect four Officers, four members of the Council for a three-year term, two Regional Directors and five members of the Committee on Research, to consider reports of the Officers and Committees, to discuss technical papers, to submit for ratification the revised pension and insurance plan for ASHAE employees as unanimously approved by the Council, and to transact such other business as may properly come before the meeting.

Hope you have made your reservations at the hotel, for transportation and special events for the 64th Annual Meeting.

P. B. GORDON
President
December 13, 1957

A. V. HUTCHINSON
Executive Secretary

FINAL CALL FOR PITTSBURGH AS CURTAIN GOES UP ON ASHAE 64TH ANNUAL MEETING

The time is now; the place, Pittsburgh and the ASHAE 64th Annual Meeting.

Are you included among the many planning to attend the sessions and committee meetings in the Penn-Sheraton Hotel on January 27-29, 1958?

Pres. P. B. Gordon, New York, N.Y. will call the 64th Annual Meeting to order at 9:00 a.m. Monday, January 27. The complete program for the Annual Meeting lists the order of all activities. It is readily apparent after reading the program that there will be plenty going on in Pittsburgh the last week of January.

Hon. David L. Lawrence, Mayor of the City of Pittsburgh

Seven technical sessions, during which 17 papers and 2 symposiums will be presented, and meetings of the Council, the Committee on Research, and various committees, as well as technical advisory committees, are scheduled from Saturday, January 25 to and including Thursday, January 30.

The results of the election will be reported at the Tuesday morning sessions by the Inspectors of Election; formal introduction and installation of the officers is to take place during the Annual Banquet on Wednesday evening, January 29.

David L. Lawrence, Mayor of the City of Pittsburgh, principal speaker at the Welcome Luncheon on Monday will be introduced by T. F. Rockwell, luncheon toastmaster and general chairman of the Pittsburgh Chapter Committee on Arrangements for the Annual Meeting. The Mayor's subject is *Pittsburgh, A City Whose Dreams Come True.*

Re-elected last month, Mayor Lawrence has served as the mayor of Pittsburgh since 1946. In 1955 he received the Distinguished Service Award of the United States Conference of Mayors, the first mayor so honored.

Allison R. Maxwell, Jr., president of Pittsburgh Steel Company, invited to deliver the Annual Banquet address, has selected as his subject *What Steel Means to You.* He will be introduced by Thomas C. Pratt, toastmaster for the banquet, and a member of *AIA*.

Alcoa Building, Pittsburgh, Pa.

The registration desk will open Sunday, January 26, at 1:30 p.m. in the Pittsburgh Room, continuing Monday through Wednesday starting at 9:00 a.m. in the Fort Duquesne Room. Only Sunday registration will take place in the Pittsburgh Room.

(*Continued on p.* 232)

Method of Choosing Location of, Financing and Conducting Meetings of the Society

Resolved: That inasmuch as the Annual and Semi-Annual Meetings of the Society come under the jurisdiction of the Council, the following rules governing the handling of such meetings be adopted by the Council and published in the JOURNAL of the Society at least twice during every year, preferably just prior to each meeting.

1—The Council will select the city in which the Annual or Semi-Annual Meeting is to be held, giving due consideration to the invitations received from Chapters or members as well as to the advisability of so distributing those meetings as to make them of the greatest advantage to the general membership, and to reduce as far as possible the expense of members attending.

2—That an appropriation be made to cover the entertainment or local expenses, incurred in connection with the meeting, and the regular meeting expenses to be taken care of by the General Fund of the Society in the regular way.

3—That no registration fee or compulsory obligations of any nature be imposed on members or guests.

4—That the purchase of tickets for banquets or for any other form of entertainment that may be provided be entirely voluntary.

5—That the grouping of features and the sale of tickets for group features be discouraged.

6—That the raising of funds from manufacturers of heating apparatus be discouraged.

7—That the display of samples, or of literature, advertising the product of any manufacturer in any way, shape or form, be not permitted at the booths, registration desk, or in or about the meetings.

8—That the distribution of trade papers be entirely at the discretion of the committee in charge.

9—That the local Chapter or local members be empowered to form a General Committee with such sub-committees as may be required to handle the details of transportation, hotel accommodations, entertainment, finance, etc., and that this General Committee be requested to confer frequently with the Council, through the Executive Secretary of the Society, and to make frequent reports on progress in connection with the various matters being handled by them.

10—That the arrangements of elaborate and costly entertainment features be discouraged.

Adopted at Council Meeting, January 29, 1926.

TENTATIVE PROGRAM — 64TH ANNUAL MEETING

Penn-Sheraton Hotel, Pittsburgh, Pa.

January 27-29, 1958

Saturday — January 25

- 10:00 a.m. Committee Meetings
- 1:00 p.m. Research Executive Committee, H. A. Lockhart, *Chairman*

Sunday — January 26

- 10:00 a.m. Council Meeting
- 10:00 a.m. Committee on Research, B. H. Jennings, *Chairman*
- 1:30 p.m. Registration (*Pittsburgh Room*)

Monday — January 27

- 9:00 a.m. Registration (*Fort Duquesne Room*)
- 9:00 a.m. First Session
  - Call to Order — Pres. P. B. Gordon
    - Report of President — P. B. Gordon
    - Report of Council — A. V. Hutchinson
    - Report of Treasurer — C. H. Pesterfield
    - Topical Session on Solar Energy
      - R. C. Jordan, *Chairman*
      - Direct Solar Radiation Available on Clear Days, by J. L. Threlkeld and R. C. Jordan
      - A High-Flux Low-Temperature Solar Collector, by R. G. Nevins and P. E. McNall, Jr.
      - Performance of a Solar Heated Office Building, by F. H. Bridgers, D. D. Paxton and R. W. Haines
      - Sun Energy Assistance for Air-Type Heat Pumps, by C. P. Davis, Jr. and R. I. Lipper
- 12:30 p.m. Welcome Luncheon
  - *Toastmaster*: T. F. Rockwell, Pittsburgh
  - *Invocation*: Rev. Vernon F. Gallagher, C.S. Sp., president, Duquesne University
  - *Speaker*: Hon. David L. Lawrence, Mayor of Pittsburgh
  - *Subject*: Pittsburgh, A City Whose Dreams Come True
  - Presentation of Certificates to Fellows
  - Presentation of ASHAE - Homer Addams Award
- 2:00 p.m. TAC Meetings: Air Cleaning; Heat Transfer through Fenestration; Hot Water and Steam Heating; and Sorption
- 2:00 p.m. Inspection Trips
- 2:30 p.m. Ladies' Tea and Entertainment
- 9:30 p.m. Gay Nineties Party

Tuesday — January 28

- 9:00 a.m. Registration (*Fort Duquesne Room*)
- 9:30 a.m. Second Session
  - Call to Order — 1st Vice Pres. E. R. Queer
    - Report of Committee on Research — H. A. Lockhart, *Chairman*
    - Report of Inspectors of Election
    - Cooling Load from Thermal Network Solutions, by Harry Buchberg
    - The ASHAE Air-Borne Dust Survey, by K. T. Whitby, A. B. Algren, R. C. Jordan and J. C. Annis
    - Natural Convection Cooling and Dehumidifying, by L. G. Seigel and W. L. Bryan
    - Stable Hot-Wire Anemometer for Low Speeds, by J. F. Kemp (by title only)
- 9:30 a.m. Third Session
  - Call to Order — 2nd Vice Pres. A. J. Hess
    - Symposium on High Temperature Water
      - P. N. Vinther, *Moderator*
      - Economic Evaluation of High Temperature Water, by E. M. Thompson
      - Marine Application of High Temperature Water, by S. W. Brown
      - Design of High Temperature Water Systems for Military Installations, by C. A. Carter and B. L. Sturdevant
      - Heating and Air Conditioning a Civilian Airport, by Charles Broder
      - British and European Design and Construction Methods, by George Applegate, Jr.
    - Report of Inspectors of Election
- 10:00 a.m. Ladies' Bus Tour and Luncheon
- 12:15 p.m. Dutch Treat Luncheon — Life Members Club
- 1:00 p.m. Inspection Tours
- 1:30 p.m. Nominating Committee Meeting
- 1:30 p.m. TAC Meetings: Combustion; Heat Pump; Industrial Environment; Solar Energy Utilization; and Weather Data
- 7:00 p.m. Past Presidents' Dinner
- 7:30 p.m. TAC Meetings: Heating and Air Conditioning Loads; Insulation; Odors; Sound and Vibration Control
- 8:00 p.m. Chapter Editors' Conference, B. W. Farnes, *Chairman*

Wednesday — January 29

- 9:00 a.m. Registration (*Fort Duquesne Room*)
- 9:30 a.m. Fourth Session
  - Call to Order — Pres. P. B. Gordon
    - Effect of Heated-Floor Temperatures on Comfort, by R. G. Nevins and A. O. Flinner
    - Lighting and Cooled Air Effects on Panel Cooling, by L. F. Schutrum and T. C. Min
    - Radiant Drafts from Cold Ceilings, by H. E. Ronge and B. E. Lofstedt
- 9:30 a.m. Fifth Session
  - Call to Order — Treas. C. H. Pesterfield
    - Local Climatic Weather Data, by W. L. Holladay
    - A Dynamic Heat Storage System, by T. L. Etherington
    - Improving Attic Space Insulating Values, by F. A. Joy
- 2:00 p.m. Sixth Session
  - Call to Order — 1st Vice Pres. E. R. Queer
    - Chimney and Stack Design for Gas-Fired Equipment, by R. L. Stone
    - Pressure Losses and Flow Characteristics of Multiple-Leaf Dampers, by E. J. Brown and J. R. Fellows
    - Fan Noise Variation with Changing Fan Operation, by R. D. Madison and J. B. Graham
- 2:00 p.m. Seventh Session
  - Call to Order — Pres. P. B. Gordon
    - Symposium on School Heating, Ventilating and Air Conditioning
      - W. G. Hole, *Moderator*
      - Educator's View of Need for Good Classroom Environment, by G. B. Wadzeck
      - HV&AC Design Practice for Schools, by Henry Wright
      - Economics of School Heating and Air Conditioning, by Z. A. Marsh
      - State Board Problems — Financing and Others, by C. B. Hershey
      - Looking Into the Future, by E. G. Good
    - Report of Resolutions Committee
    - Unfinished Business
    - New Business
    - Adjournment
- 7:00 p.m. Annual Banquet
  - *Toastmaster*: Thomas C. Pratt; Member of Ingham, Boyd & Pratt, Architects
  - *Invocation*: Dean N. R. H. Moor, D.D., Trinity Episcopal Cathedral, Pittsburgh
  - *Speaker*: Allison R. Maxwell, Jr., President, Pittsburgh Steel Co.
  - Introduction and Installation of 1958 Officers
  - Presentation of F. Paul Anderson Medal
  - Presentation of Past President's Award to P. B. Gordon

Thursday — January 30

- 9:00 a.m Organization Meeting of 1958 Council
- 10:00 a.m. Organization Meeting of 1958 Committee on Research

JOURNAL SECTION

(Continued from p. 230)

Many special events for the ladies and children are planned to make their visit to Pittsburgh a pleasant and memorable occasion.

Tuesday afternoon members and guests have an opportunity to visit either the Homestead Steel Works, Gulf Oil Corp. Research Laboratories or the Pittsburgh Consolidated Coal Co.

Yes, the time is now! Hurry, get those rail or airline tickets, pack up the family and head for Pittsburgh and another wonderful ASHAE Annual Meeting. The committees have done and still are doing everything possible to provide a successful Annual Meeting but only your attendance guarantees this success!

COUNCIL ELECTS FELLOWS

The membership grade of Fellow is conferred by the Council on members who have attained unusual distinction. At its meeting on October 12, the Council designated 8 members to become Fellows. Following are short biographies of these newly-elected Fellows.

Albert L. Baum, member of the firm, Jaros, Baum & Bolles, New York, N.Y., has been responsible for design and management in numerous major engineering projects. Mr. Baum and his firm have been concerned with heating, ventilating and air conditioning of such large buildings as Tiffany & Co., Socony Vacuum Oil Co., and the new Chase-Manhattan Bank Bldg., New York, N.Y., and with important mechanical work, including a U. S. Navy project, Panama Canal Zone.

After receiving his A.B. and M.E. from Columbia University, Mr. Baum joined Nygren, Tenney & Ohmes, New York City, and was soon directing heating, ventilating and steam power projects. In 1915 the consulting engineering firm of Jaros and Baum was formed, later becoming Jaros, Baum & Bolles. During World War I Mr. Baum interrupted his business to join the Bureau of Yards and Docks, U. S. Navy, Washington, D. C.

ASHAE Life Membership was bestowed upon Mr. Baum last year, after 40 years of membership. In addition, he belongs to *New York Association of Consulting Engineers, New York Society of Professional Engineers,* and Phi Beta Kappa. He has served on the board of governors, New York Building Congress, and is on the board of trustees, Mount Sinai Hospital, and national panel of arbitrators, *American Arbitration Association.*

Alfred C. Buensod*, chairman of the board, Buensod-Stacey, Inc., New York, N.Y., pioneered in development of air conditioning for theaters and motion picture production, and specialized in application of air conditioning to the tobacco industry. He is the author of numerous articles on these subjects.

Mr. Buensod, who received his M.E. from Stevens Institute of Technology, first conducted experiments and developed processes for tobacco conditioning while with the International Cigar Machinery Co., New York, N.Y. He was one of the founders of Carrier Engineering Corporation in 1915, and continued this specialization.

Leaving Carrier in 1935, Mr. Buensod established Buensod-Stacey Air Conditioning, Inc., the contracting firm which later became Buensod-Stacey, Inc. After serving for many years as president of the organization, he was named chairman of the board last year.

A member of the Society since 1918, Mr. Buensod was honored by Life Membership in 1951. He served on the Joint Committee for Revision of Code of Minimum Requirements for Comfort Air Conditioning, 1951-53; Joint Committee on Standards for Comfort Air Conditioning since 1954. In addition to his active interest in ASHAE affairs, Mr. Buensod worked on code committees of *ASRE* and *HP&ACCNA.* He holds a number of patents, and is a registered professional engineer in 11 states.

Irwin W. Cotton, who retired from his heating and ventilating business a few years ago, is presently active as a member of the Marion County (Indiana) Council, Indianapolis, of which he has been president. He was selected as a member of the Society's Council, 1953-55, and of its Committee on Research, 1949-54, with chairmanship for 1951-52.

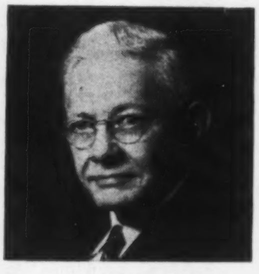
Mr. Cotton received a B.S. from both John B. Stetson University, Deland, Fla., and the University of Chicago, 1908. He entered the heating contracting field in 1914. Shortly after release from World War I duty as an engineering officer, United States Naval Reserve, he returned to heating contracting, and in 1928 established I. W. Cotton Co., Inc. In subsequent years, Mr. Cotton eliminated the contracting phase of the business, changing to distribution of controls, and then added representation of manufacturers. Interrupting these activities, he served as district fuel rationing officer, Office of Price Administration, and as a member of the Indianapolis Anti-Air Pollution Board.

Joining the Society in 1943, Mr. Cotton became a charter member of the Indianapolis Chapter, which he served as president, 1947. He promoted the Society research program in writing for the JOURNAL and in talks at chapter meetings, as well as being active on various committees. He is a member and past president of the Indianapolis Air Conditioning Council; a member and former director, 1950-56, of the Indianapolis Chamber of Commerce.

Edward L. Crosby, is a member of the firm and senior mechanical engineer, Henry Adams, Inc., Baltimore, Md. His wide and varied experience won him the commission as engineering consultant to the Government in connection with the recent renovation of the White House. Mr. Crosby was president of Henry Adams, Inc., 1930-46, and has served since as treasurer, concerning himself principally with administrative client and public relations activities.

Before joining the Adams office in 1930, Mr. Crosby had experience in plant operation, equipment design and maintenance. After he received his B.S. in mechanical

A. L. Baum
New York, N.Y.



A. C. Buensod
New York, N.Y.

I. W. Cotton
Indianapolis, Ind.

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*Deceased, November 25, 1957.

E. P. Heckel
Chicago, Ill.

C. F. Kayan
New York, N.Y.

F. B. Rowley
Minneapolis, Minn.

G. M. Simonson
San Francisco, Calif.

engineering, University of Pennsylvania, 1910, he worked for the Pittsburgh Valve, Foundry and Construction Co. until war service in the Ordnance Department, U.S.A. He was discharged in 1918 as major, Ordnance Reserve Corps. He then became special assistant to the general manager, Edgewater Steel Co., and for 9 years was chief engineer, Standard Sanitary Manufacturing Co., Baltimore.

An active member of the Society since he joined in 1936, Mr. Crosby has been a member of the Nominating, Long-Range Planning and Chapter Relations Committees; a delegate, Chapters Conference Committee; and chairman, Admission and Advancement, and Charter and By-Laws Committees. A charter member and first president, 1949, of the Baltimore Chapter, Mr. Crosby was a guiding light in its formation. He is a professional engineer registered in Maryland, Pennsylvania and New York, and is a member of the Baltimore Engineers Club.

Edmund P. Heckel, consulting mechanical engineer, E. P. Heckel & Assocs., Chicago, has been active in the heating and ventilating field since 1904. In that year he joined Buffalo Forge Co., Buffalo, N.Y., as erecting superintendent. He later worked for the Carrier Air Conditioning Co., organized as a subsidiary of Buffalo Forge Co., as construction superintendent, estimator and engineer in the New York and Chicago offices. He helped develop air-conditioning techniques and applications.

One of the 7 original founders in 1915 of Carrier Engineering Corporation (now Carrier Corporation), Mr. Heckel worked as field representative and sales engineer in New York, N.Y. Transferring later to Chicago, he held the post of vice president and western manager of the Corporation for 20 years. Since 1939 he has managed a consulting engineering office, with specialization in heating, ventilating, air conditioning and refrigeration.

Mr. Heckel was honored by Society Life Membership in 1949. His activities have included membership on TAC's and the Guide Publication Committee, plus chairmanship of the Admission and Advancement, and Research Finance Committees. His service to the Illinois Chapter culminated in the presidency, 1928. He is a registered professional engineer, State of Illinois, and is affiliated with *ASRE*, the *Chicago Association of Consulting Engineers*, and for the past 3 years has been chairman of the Chicago Industrial Ventilation Code Committee. Articles by him have been published in *Heating, Piping & Air Conditioning.*

Carl F. Kayan, professor, department of mechanical engineering, Columbia University, New York, N.Y., has been associated with the University for 33 years. In his research activities he has been particularly concerned with development of the electrical analogue approach in the study of heat transfer processes. A number of papers on this subject have been published in TRANSACTIONS.

Columbia granted him an A.B., 1922, and M.E., 1924, after which he began investigations in heat transfer as research assistant. Entering the department of mechanical engineering as teaching assistant, he was named an instructor in 1927, advancing to assistant professor, 1937; associate professor, 1944; and professor, 1948. He served as executive officer of the department from 1948 to 1955.

Professor Kayan was a visiting professor, Royal School of Technology, Stockholm, Sweden, 1955. He has been U. S. observer and ASHAE representative at meetings of Institut du Froid in France, Belgium and Switzerland. In 1953 he was appointed a member of the Board of Air Pollution Control, New York, N.Y.

His Society service includes membership on Guide Publication and Chapter Relations Committees and several technical advisory committees. He is a past president of ASHAE's New York Chapter, 1950, and the *Instrument Society of America;* honorary vice president, *John Ericsson Society of New York;* a member of *ASME, ASRE, ASEE, AAAS,* Sigma Xi, Tau Beta Pi, and Pi Tau Sigma.

Frank B. Rowley, professor of mechanical engineering, emeritus, University of Minnesota, Minneapolis, has enjoyed a 50-year career with the University. His election as Society president in 1932 followed service as 1st and 2nd vice president, member of Council and chairman of the Committee on Research.

Having received his B.S. in mechanical engineering and M.E. from the University of Wisconsin, he gained a year's engineering experience with Racine Gas Light Co. Starting at the University of Minnesota as an instructor, he became assistant professor of experimental engineering, 1915; associate professor of mechanical engineering and director of the experimental engineering laboratories, 1919; full professor, 1921; director, engineering experiment station, 1938; and departmental head, 1941.

For many years Professor Rowley acted as a consulting engineer for the State Securities Commission, State of Minnesota. His laboratory investigations have covered such subjects as air filters, insulating materials, comfort reactions and heat transmission. Numerous technical papers, with Professor Rowley as author or co-author, have been published in the Society's TRANSACTIONS.

Widely honored, he received the F. Paul Anderson Medal, 1939; a certificate of recognition from the *ASME* Minnesota Section, 1944; Society Life Membership, 1949. Professor Rowley was elected president of the Society's Minnesota Chapter for 1922. Additionally, he is a fellow, *AAAS;* member, *ASRE, ASEE, NSPE,* Sigma Xi, Tau Beta Pi, and Pi Tau Sigma.

George M. Simonson, who has had offices as a consulting mechanical and electrical engineer in San Francisco since 1924, is sometimes referred to as the 'dean' of consulting engineers in his area. Included in his lengthy list of projects are many at the University of California and at Stanford University.

A few years after receipt of his B.S. in mechanical engineering, University of California, 1912, Mr. Simonson became chief electrical engineer, Division of Architecture, State of California Department of Public Works, Sacramento. In 1924 he opened a consulting office as Simonson & St. John, and then started on his own 2 years later.

In 1937, the same year he joined the Society, he helped organize the Golden Gate Chapter and served on its board of governors. He was selected as Chapter president, 1938-39; general chairman of the Society's 1941 Semi-Annual Meeting, and honorary chairman, 1955 Semi-Annual Meeting.

Last year he was voted as Outstanding Engineer of the *Consulting Engineers Association of California.* He is also a member of *ASRE, IES, AIEE,* California State Board of Registration for Civil and Professional Engineers, and the Code Committee of the City of San Francisco. He serves as vice president of the Legislative Council for Professional Engineers. Articles written by Mr. Simonson have been published in *Electrical West Magazine.*

ACTIVITIES OF SOCIETY CHAPTERS

Chapter activities are now in full swing. There was a New Chapter on Long Island Chartered. At regular meetings of the other chapters, the members heard Regional Directors Report and B. H. Jennings Speak on Research. Along with other provocative Technical Talks and varied Non-technical Programs, Panel Discussions were featured and a Pipe Corrosion study was widely scheduled. Individual members received recognition in Elections and Appointments, and particularly by Plaudits.

New Chapter on Long Island Chartered

Some 50 Chapter members and guests attended the Charter Meeting November 21, of Long Island Chapter, 70th Chapter in the Society, at the Garden City Hotel, Garden City, L.I.

The chapter charter was presented to Long Island Chapter's newly elected Pres. Henry J. Campbell, Jr., by Society Pres. P. B. Gordon, New York.

John Everetts, Jr., Philadelphia, Pa., Regional Director of Region 1, opened the meeting and introduced the guests who included besides President Gordon and Regional Director Everetts, E. R. Queer, first vice-president; L. N. Hunter, Society past president; A. V. Hutchinson, executive secretary; F. H. Faust, Bloomfield, N. J., and F. W. Hofmann, assistant secretary.

Principal speaker was President Gordon whose topic was *Our Bottleneck—Technical Know-how.* Professor Queer addressed the group on *The Value of a Chapter to a Society Member,* and Mr. Faust told *Why Chapter Membership.*

Professor Queer presented the Chapter gavel, gift of Johnstown Chapter, to Chapter President Campbell, and Mr. Faust presented the record books to C. M. Alston, newly elected vice president of the chapter. At a brief business session the members approved the Chapter By-Laws and voted for the following slate of Officers, presented by Hugo Basch, chairman of the nominating committee: President — Henry J. Campbell, Jr.; Vice President — Clyde M. Alston; Treasurer — Sidney M. Walzer; Secretary — James L. Page. Board of Governors: William T. Cleland, William H. Hoops, William G. Kane.

Mr. Cleland was named secretary of the meeting. R. J. Irving and C. W. Miller were in charge of arrangements.

Technical Talks

Conduits for Underground Piping was the subject of a talk presented at a BALTIMORE Chapter meeting by A. C. Carlson, manager, conduit department, H. W. Porter Co., Newark, N. J. Questions following the talk proved the subject's appeal. • • • The CENTRAL OHIO Chapter members were given *A Look at the Present and Future of Electric Resistance Space Heating.* At the beginning of this presentation, the speaker, R. W. Osterholm, system commercial manager, Ohio Power Co., Canton, Ohio, explained that while for some time it has been technically possible to heat homes and other buildings with electrical resistance heating, the cost was prohibitive until recently. Some of the advantages of electric heating, as noted by Mr. Osterholm, are paucity of equipment, cleanliness, and flexibility in building design and furniture arrangement. • • • D. H. Vance, vice president and executive engineer, The Korfund Co., Inc., Long Island City, N. Y., addressed the CINCINNATI Chapter on *Vibration and Noise Control for Air Conditioning.* • • • Magic tricks enlivened a presentation of facts on refrigerants given at an EL PASO Chapter meeting. The speaker was D. C. Anderson, a southwest sales representative, General Chemical Division, Allied Chemical & Dye Corp., New York, N. Y. • • • The first joint meeting of the EMPIRE STATE CAPITAL Chapter and the Hudson-Mohawk section of *ASRE* was held. Cecil Boling, president and treasurer, Dunham-Bush, Inc., New York, N. Y., described the advantages of a suction line heater in the refrigeration field. • • • An educational program on the *Characteristics of Forced Hot Water Heating Systems* was given at a meeting of the FORT WORTH Chapter by Frank Gall, manager, heat transfer department, Bell & Gossett Co., Morton Grove, Ill. His discussion began with the history of man's use of fire to heat water for human comfort. Mr. Gall explained why there are air problems, why it is important that the pump is matched to the system, and how the location of the compression tank affects the operation of a system. • • • ILLINOIS Chapter members heard J. S. Locke, sales manager, Commercial Controls Division, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., speak on the history and increasing efficiency of air conditioning. • • • Discussing the basic theory of snow formation for the benefit of the IOWA Chapter members, D. H. Snyder, engineering sales and service, National Tube Division, United States Steel Corp., Chicago, Ill., indicated that snow temperature is always assumed to be equal to the ambient temperature. Mr. Snyder's talk covered the variables in the snow melting design problem and factors affecting the total heat requirement. • • • The pros and cons of using the underwriter's label on air-conditioning equipment were given by L. R. Parlette, C. R. Buck, Jr., W. W. McMillan and J. L. Leggett at a JACKSONVILLE Chapter meeting. Following the talks by these code committee members, Hugh Mainey, City Building Department, explained that his department's function is to administrate, and not to originate, a code. • • • An informative presentation on *Air Purification with Activated Charcoal* was given before a MISSISSIPPI Chapter audience by Dick Trout, sales manager, Pur Air Division, Barneby-Cheney Co., Columbus, Ohio. • • • At a SOUTHERN PIEDMONT Chapter meeting, Mr. Roach, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., selected supervisory data centers for large air-conditioning projects as his subject. Colored slides supplemented this interesting talk.

Regional Directors Report

A CINCINNATI Chapter audience heard P. J. Marschall, regional director of Region 2, outline the history of the Society and describe in detail the accomplishments and tasks of the Society in the field of research. • • • A report on recently-formed Society chapters was given by C. B. Gamble, regional director, Region 5, at a DELTA Chapter meeting. • • • W. G. Hole, regional director, Region 7, advised the MANITOBA Chapter of various changes in research personnel and expressed gratitude for the members' good attendance. • • • Pres. C. R. Hiers, NEW YORK Chapter, introduced John Everetts, Jr., regional director, Region 1, to a meeting audience. Mr. Everetts announced that the regional meeting had been set for March 17.

Jennings Speaks on Research

The newly selected director of research, B. H. Jennings, was a guest speaker at the JOHNSTOWN and MINNESOTA Chapters. In his talk on *Research Frontiers in Heating and Air Conditioning,* Mr. Jennings noted that research work during the last 10 years has developed great significance. He pointed out that ASHAE is the only major technical society actively supporting a research program. A number of the projects completed or in progress were described and illustrated with slides. Mr. Jennings also spoke at the 12th annual joint meeting of the ASHAE Pittsburgh Chapter and *ASRE* on *The Present Status of Research in Air Conditioning and Refrigeration.*

Pipe Corrosion Studied

At meetings of the BRITISH COLUMBIA, INLAND EMPIRE, OREGON and PUGET SOUND Chapters, R. J. Bricmont, A. M. Byers Co., Pittsburgh, Pa., gave a comprehensive discussion on pipe corrosion. Factors affecting rate and seriousness of corrosion, such as dissolved minerals in the fluid, dissolved gases, ph factor, turbulence, temperature and velocity of the liquid, were treated. Various methods for combating corrosion were outlined in this outstanding presentation.

Panel Discussions

The various aspects of school air conditioning were touched upon in a panel discussion held by the INDIANA Chapter together with the members of the PURDUE UNIVERSITY Student Branch. J. W. McElgin, vice president and engineer, John J. Nesbitt, Inc., Philadelphia, Pa., gave the manufacturer's point of view. Problems encountered in the design of air-conditioning systems for schools and the economic aspects involved were explained from the consulting engineer's viewpoint by Rhiman Rotz, J. M. Rotz Engineering Co., Inc., Indianapolis, Ind. The school administrator's side of the question was represented by O. H. Roberts, Jr., attorney and civic leader, Evansville, Ind. • • • The *Future of Natural Gas in Manitoba* was the subject of a panel featured by the MANITOBA Chapter. Pres. R. M. Fraser introduced the guest panel members: K. Cairns, advertising manager, Winnipeg and Central Gas Co., and M. DelBegio, chief inspector, Engineering Division, Department of Labour, Province of Manitoba. W. J. Atkinson, heating department manager, The Winnipeg Supply & Fuel Co., Ltd., Winnipeg, Man., was introduced as moderator of the panel. The other speakers were K. B. Watson, assistant heating engineer, Moody & Moore, Winnipeg, who represented engineers and architects, and and W. L. Algie, manager, Crane Assocs., Winnipeg, who represented the manufacturers. The panel discussed many aspects of natural gas and conditions which will further the future of this fuel in Manitoba. • • • Vice Pres. G. B. Ramsey, Jr., MEMPHIS Chapter, introduced a panel including O. A. Holmes, Jr., Ed Scott, and H. H. Wilson, who led a lively and educational session on the proper location of pumps, expansion tanks, air vents and other components of hot and chilled water systems. • • • A panel discussion on *Bid Depository* was scheduled by the MONTREAL Chapter. After summarizing tender procedure with bid depository, H. B. Cooper, professional engineer, A. Cooper & Son, Ltd., Montreal, Que., introduced the panel members. The viewpoint of the bid depository office was presented by J. P. Cartier; J. Weiss described the features and mechanics of the tendering procedures; Mr. Dawson covered the loopholes in the process, and the practice of driving down prices at the subcontractor's level was noted by R. I. Brasloff. At the question and answer session following the talks, the panel members further clarified the bid depository picture. • • • NORTH TEXAS Chapter programmed a panel on *The Control of High Velocity Air Distribution Systems*, with M. W. Brown, field engineer, American Blower Corp., Dallas, Tex., acting as moderator. The panel, consisting of J. D. Poythress, R. G. Lyford, Richard Dickson and H. V. Alexander, placed special emphasis on double-duct systems and static pressure control. • • • *Air Conditioning in State Public Works* was the subject of a panel presentation at a SOUTHERN CALIFORNIA Chapter meeting. K. G. Blessing, program committee chairman, introduced the panel of speakers from the California State Division of Architects: Preston Roach, mechanical engineer, who outlined the steps required to develop a project; Mac Cason, *AIA* supervising project architect, detailed building requirements; Ben Harder, district structural engineer, school checking section, described the function and operation of his group, and Will Geselbracht, senior mechanical engineer, who covered technical aspects of air conditioning in state buildings.

Nontechnical Programs

Members and guests of the CENTRAL NEW YORK Chapter viewed a colored film, which described the St. Lawrence Seaway project. Many interesting scenes showing actual construction phases of locks and dams were included. • • • Featured at the annual ladies night meeting of the DELTA Chapter was a penetrating presentation on *People, Politics and Planning* by Louis Bisso, director, City Planning Commission, City of New Orleans, La. • • • INDIANA Chapter scheduled a talk by one of its past presidents, James Jackson, co-owner, Jackson Engineering Co., Inc., Indianapolis, Ind. Past President Jackson related his experiences while serving on and being foreman of the Grand Jury. • • • His experiences and observations while in business in the Union of South Africa were related by J. B. Russell, Sioux City, Ia., at a meeting of the NEBRASKA Chapter. • • • Bob Finley, Southwest Conference football official and former Southern Methodist University football star, gave an interesting talk on football rules and future prospects for an audience composed of the NORTH TEXAS Chapter and their guests, the FORT WORTH Chapter. Also on the program was the showing of a movie entitled *Southwest Conference Highlights.* • • • The recent growth of suburban shopping centers has greatly hurt business interests in the downtown area of most cities throughout the United States, according to D. H. Lutz, architect, Springfield, Ore. In his talk at an OREGON Chapter meeting, Mr. Lutz explained *Downtown Revitalization*, an experiment carried out this past summer by the town of Springfield in an effort to determine whether or not downtown businesses could be revived. The successful operation was conducted by blocking off downtown streets and rerouting traffic, establishing an uncongested area to attract shoppers. • • • A welcome innovation was used by a ROCKY MOUNTAIN speaker, F. E. Stark, mechanical engineer, Denver, Colo. Mr. Stark used his secretary's voice, tape recorded, for a portion of the program on *The Relationship of Engineers.* The presentation was well received. • • • The engineer-architect relationship and the necessity of their working together was expressed by J. N. Richards, senior partner, Bellman, Gillett & Richards, at a TOLEDO Chapter meeting. Mr. Richards presented an illustrated talk comparing the architecture of Toledo with European architecture. • • • Members of the NORTH CAROLINA STATE COLLEGE Student Branch heard their faculty advisor, R. B. Knight, professor of mechanical engineering at the College, discuss the Chapter, and the Society and its purpose.

Plaudits

A vote of thanks was given by the MONTREAL Chapter to T. E. Cockman for his effort in organizing a highly successful golf tournament. • • • W. J. Biggar, president, SOUTHERN CALIFORNIA Chapter, also gave a vote of thanks to L. R. Kelly, chairman of the steering committee, for the excellent guidance he has given in respect to the new Los Angeles air conditioning, heating and ventilating codes.

Elections and Appointments

Pres. A. C. Martin, BRITISH COLUMBIA Chapter, announced the names of the committee chairmen for the 1957-58 term: *Membership*—R. A. Malcolm; *Publicity*—R. G. Cawker; *Attendance*—R. G. MacDonald; *Finance*—R. L. Rodway; *Program*—F. J. Dwyer; and *Special Events*—H. E. McConaghy. • • • The following JOHNSTOWN Chapter committee appointments were announced: *Program*—K. O. Schlentner; *Membership*—P. M. Sarraiocco; *Attendance*—H. M. Gibb; *Publicity*—J. W. Hall; *Finance*—R. B. Johnson, Sr.; and *Special Events*—F. E. Rigby. • • • A nominating committee consisting of J. A. Ray, S. E. Ammons and B. B. Wallace, Jr., was appointed by the unanimous vote of the NORTH TEXAS Chapter. • • • Members of the OREGON Chapter elected a nominating committee consisting of W. R. Norte, W. B. Morrison, T. E. Taylor and J. Donald Kroeker, with B. W. Farnes as chairman. • • • For the coming season, Pres. C. W. Watson, OTTAWA VALLEY Chapter, appointed the following committee chairmen: *Program*—J. Klassen; *Membership*—G. W. Richards; *Publicity and Public Relations*—V. D. Hossack; *Finance*—S. J. Bullis; *Attendance*—I. M. Paterson; and

JOURNAL SECTION

Legislation—D. W. Banton. • • • At a PUGET SOUND Chapter meeting, Pres. E. W. Triol appointed R. L. Langdon as publicity chairman and Fred Thorn as special events chairman. • • • New officers were elected by the SOUTH TEXAS Chapter: *President*—A. B. Ullrich, Jr.; *Vice President*—E. B. Appling; *Secretary*—H. D. McMillan; *Treasurer*—H. B. McKee; *Board of Governors*—E. H. McLane and P. C. Nail.

FALL MEETING FOR REGION 6 CHAPTERS REGIONAL COMMITTEE

For the first time, a Chapters Regional Committee has held a fall meeting. This took place when the Chapters Regional Committee for Region 6 met in Austin, Tex., on October 4. Members and alternates were present from 9 chapters in the region and Regional Director D. M. Mills, Houston, Tex., presided. Present also were P. N. Vinther, Dallas, Tex., member of the Council, and Second Vice Pres. A. J. Hess, Los Angeles, Calif. All together, the meeting attracted some 25 people. B. J. Barnhart, Austin, Tex., was elected to act as secretary for the meeting.

Much of the business transacted by the committee at the meeting had to do with the matter of Chapters' activities in connection with assisting cities in preparing codes.

J. S. Malahy, Jr., Shreveport, La., was selected to represent Region 6 as first alternate on the Society's Nominating Committee.

The committee also decided on names of members from the region who might be recommended for appointment to Society committees.

B. E. Segall, Jr., Austin, Tex., presented a report on Air Conditioning in the Austin Public School System. It was decided that this School Report should be sent to the Regions Central Committee for its attention.

CANDIDATES FOR MEMBERSHIP

Listed here are the names of 160 men who are candidates for membership or advancement in membership grade. Members are requested to assume their full share of responsibility of receiving these candidates into membership by advising the Executive Secretary before January 31, 1958, of any whose eligibility for membership is questioned. Unless such objection is made these candidates will be voted upon by the Council.

Note: *Advancement †Reinstatement

California (*Region* 4)

Apaydin, Nihat*, A-C. Design Engr., Climate Conditioning Co., Los Angeles.

Biggar, W. J.*, Br. Sales Mgr., Minneapolis-Honeywell Regulator Co., Los Angeles.

Laskowski, L. M., Service & Installation Mgr., Minneapolis-Honeywell Regulator Co., Los Angeles.

Lee, C. H.*, Mech. Engr., Eagleson Engineers, San Francisco.

Mac Culloch, D. P.*, Sr. Sales Engr., The Powers Regulator Co., Los Angeles.

Malone, J. G., Repr., Johns-Manville Sales Corp., Los Angeles.

Nickel, R. B., Owner, Central Heating & Sheet Metal, Sacramento.

Snyder, R. M., Cons. Engr., Robert M. Snyder & Assoc., Stockton.

Spurr, W. C., Sales Repr., American-Standard, Plumbing & Heating Div., San Francisco.

Connecticut (*Region* 1)

Batchelor, W. L.*, Chief Engr., Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain.

Carey, E. J., Htg. Engr., J. E. Carey Co., West Hartford.

District of Columbia (*Region* 5)

Reaves, F. M., Vice Pres., R. M. Thornton, Inc., Washington.

Florida (*Region* 5)

Juha, Steve, Jr., Sales Engr., Bakers, Inc., Jacksonville.

Georgia (*Region* 5)

McDonald, J. L., Chief Engr., Sea Island Co., Sea Island.

Illinois (*Region* 2)

Nelson, G. R., Mgr., Htg. & A-C., Northern Illinois Gas Co., Bellwood.

Preble, J. D., Supvr. of Utilization, Northern Illinois Gas Co., Bellwood.

Indiana (*Region* 2)

Kercheval, W. L.*, Prod. Appl. Engr., Pfau-Vogel Co., Indianapolis.

Westphal, N. E.*, Director of Research & Engrg., Weil-McLain Co., Michigan City.

Kentucky (*Region* 5)

Bryant, L. P., Chief Engr., Continental Air Filters, Inc., Louisville.

Gregory, W. K., Pres., Continental Air Filters, Inc., Louisville.

Johnston, F. B., Jr., Vice Pres., Continental Air Filters, Inc., Louisville.

Louisiana (*Region* 5)

Goldstein, H. G., Mech. Engr., deLaureal & Moses, New Orleans.

Maryland (*Region* 5)

Beese, J. C., Jr., Vice. Pres., F. C. Clifford, Inc., Baltimore.

Schultz, E. K., Jr.*, Sr. Sales Engr., Johnson Service Co., Baltimore.

Massachusetts (*Region* 1)

Bjorkman, R. K. A., Tech. Engr., General Electric Co., Lynn.

Michigan (*Region* 2)

Garst, J. L.†, Sales Engr., Saunders & Co., Detroit.

Ghianni, E. J., Dist. Sales Mgr., Walter Vallett Co., Detroit.

Minnesota (*Region* 3)

Ashenfelter, C. B.*, Sales Engr., Johnson Service Co., Minneapolis.

Carlson, B. L., Plt. Engr., Minneapolis-Honeywell Regulator Co., Aero Div., Minneapolis.

Carville, B. F., Assoc. Plt. Engr., Minneapolis-Honeywell Regulator Co., Aero Div., Minneapolis.

Hammer, C. C., Appl. Engr., Minneapolis-Honeywell Regulator Co., Minneapolis.

Harrington, D. A., Sales Repr., McNamara Sales Co., St. Paul.

Heinen, L. E., Sales Repr., Ruffridge-Johnson Equipment Co., Inc., Minneapolis.

Knowles, R. E., Mgr., Marshall Heating Co., Minneapolis.

Larson, C. W.†, Sr. Engr., McQuay, Inc., Minneapolis.

Mississippi (*Region* 5)

Maxson, P. R., Sales Engr., The Powers Regulator Co., Jackson.

Missouri (*Region* 3)

Albin, E. L., Sales Engr., Dunham-Bush, Inc., Brentwood.

Behrmann, R. A., Pres., Radi-Heat Engineering & Sales Co., Inc., St. Louis.

Frank, D. P., Mgr. Equip. Sales, R. H. Spangler Co., Inc., St. Louis.

Gibbons, J. D., Vice Pres. & Sales Mgr., Radi-Heat Engineering & Sales, Co., Inc., St. Louis.

Hartwein, C. E.†, Mgr., A-C. Dept., Laclede Gas Co., St. Louis.

Montana (*Region* 3)

van Teylingen, A. A., Partner, Knight & van Teylingen, Havre.

Nebraska (*Region* 3)

Curry, D. B., Htg.-A-C. Engr., North Central Gas Co., Scottsbluff.

Hoffman, Xaver, Mech. Engr., Henningson Durham Richardson, Inc., Omaha.

New Mexico (*Region* 6)

Oakley, C. R., Dist. A-C. & Htg. Engr., Southern Union Gas Co., Clovis.

Rawls, J. B., Mgr., Standard Heating & Ventilating Co., Inc., Albuquerque.

New York (*Region* 1)

Adams, D. A., Proj. Engr., Mech. Div., Voorhees Walker Smith & Smith, Long Island City.

Antonopoulos, A. J., Designer-Draftsman, Voorhees Walker Smith & Smith, Long Island City.

Asvestos, Anthony, Design Draftsman, Voorhees Walker Smith & Smith, Long Island City.

Bass, Albert, Asst. Chief, Mech. Div., Voorhees Walker Smith & Smith, Long Island City.

Beechinor, R. J., Engr., Roxen Service, Inc., Oceanside.

Benjamin, A. D., Sr. Proj. Engr., Voorhees Walker Smith & Smith, New York.

Berch, Calvin, Chief Engr., Hilrich Co., Mineola.

Bernstein, Alex, Designer, Voorhees Walker Smith & Smith, Long Island City.

Blackwell, S. M., Chief Mech. Field Engr., Voorhees Walker Smith & Smith, New York.

Capetan, G. T., Sr. Mech. Designer, Voorhees Walker Smith & Smith, New York.

Capon, S. S., Owner, Cari Conditioning Co., New York.

Cherson, Arthur, Cost Analysis Engr., Voorhees Walker Smith & Smith, New York.

Dackowski, S. J., Sales Engr., Robbins & Prime, Inc., Huntington.

Danziger, N. H., Asst. Dept. Head, Parsons, Brinckerhoff, Hall & MacDonald, New York.

Davies, J. F.†, Htg., Vtg., A-C. Engr., Voorhees Walker Smith & Smith, New York.

Feit, Philip, Designer, Voorhees Walker Smith & Smith, Long Island City.

Ferrante, N. P., Designer, Voorhees Walker Smith & Smith, Long Island City.

Ferriello, Mario, Pres., Town Metal Works & Air Conditioning, Great Neck.

Fonyi, Joseph, Jr. Designer, Voorhees Walker Smith & Smith, Long Island City.

Groopman, Henry, Repr., Roxen Service, Inc., Oceanside.

Hackel, A. D., Group Chief, Mech., Voorhees Walker Smith & Smith, New York.

Janofsky, Bernard, Engr., Voorhees Walker Smith & Smith, Long Island City.

Kallet, S. E., Group Sr. Engr., Voorhees Walker Smith & Smith, New York.

Kates, Richard, Proj. Engr., Voorhees Walker Smith & Smith, New York.

Kelsch, J. R., Jr., Designer, Voorhees Walker Smith & Smith, New York.

Kiernan, H. D., Designer & Estimator, Lakeville Utilities, Inc., Floral Park.

Koehler, R. J., Designer, Voorhees Walker Smith & Smith, New York.

Korman, Marvin, Draftsman, Voorhees Walker Smith & Smith, Long Island City.

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Law, A. F., Plumbing Engr., Voorhees Walker Smith & Smith, New York.

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Lomonosoff, B. M., Proj. Engr., Voorhees Walker Smith & Smith, New York.

Martin, G. R., Designer, Voorhees Walker Smith & Smith, New York.

Mazza, Mauro, Vice Pres., Town Metal Works & Air Conditioning, Great Neck.

Merenyi, Albin, Engr., Voorhees Walker Smith & Smith, Long Island City.

Morris, L. A., Pres., Five Towns Refrigeration Co. Inc., East Rockaway.

Page, J. L.*, Mgr. Dist. Sales, B. Klein & Sons, Mineola.

Pitkin, S. H.†, Sales Engr., Carrier Corporation, East Syracuse.

Pollenz, Emmett, Sales Engr., Taco Heaters, Inc., New York.

Raymond, S. J., Engr., Gotham Air Conditioning Corp., New York.

Scarano, R. M., Designer, Voorhees Walker Smith & Smith, Long Island City.

Schneider, H. D., Owner, Modern Air Conditioning Co., Freeport.

Sears, J. C., Proj. Engr., Simon Distributing Corp., Buffalo.

Sheridan, R. W., Sr. Draftsman, Voorhees Walker Smith & Smith, Long Island City.

Shoor, Samuel, Engr., James H. Martin, Inc., New York.

Sisti, M. F., Proj. Engr., Voorhees Walker Smith & Smith, New York.

Srebnick, B. H., Sales Engr., Acme Industries, New York.

Steinacher, H. E.*, Appl. Engr., International Div., Carrier Corporation, New York.

Tuozzolo, Daniel, Designer, Voorhees Walker Smith & Smith, New York.

Warren, C. S., Sr. Designer, Voorhees Walker Smith & Smith, Long Island City.

Wieder, A. W., Pres., Elm Air Conditioning Corp., West Hempstead.

Wise, Claude, Designer, Voorhees Walker Smith & Smith, New York.

North Carolina (*Region* 5)

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Davis, G. R., Partner, R. G. Davis & Co., Cleveland.

Helmig, G. R.*, Partner, Helmig, Lienesch & Assocs., Dayton.

Hockin, Orlin, Sales Repr., The Trane Co., Toledo.

Lienesch, T. R., Partner, Helmig, Lienesch & Assocs., Dayton.

Monnig, T. E., Design Engr., Schweiger, Heapy & Assocs., Dayton.

Robinson, James, Sales Engr., Minneapolis-Honeywell Regulator Co., Dayton.

Ryan, V. D., Sales Engr., R. G. Davis & Co., Cleveland.

Saurborn, Edward, Group Engr., Heating Div., Surface Combustion Corp., Columbus.

Shrack, John, Jr., Sales Engr., Columbus Air Conditioning Corp., Columbus.

Trout, R. L., Asst. Mgr., PurAir Div., Barnebey-Cheney Co., Columbus.

Wahlers, J. L., Estimator, Dunbar Bros., Inc., Toledo.

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Allsman, R. L., Br. Mgr. of Sales Office, American Blower Div., American-Standard, Oklahoma City.

Augsburger, N. D., Sales Mgr., Acme Equipment Co., Muskogee.

Bohanon, H. R., Chief Engr., Acme Equipment Co., Muskogee.

Caves, M. W., Prod. Engr., Acme Equipment Co., Muskogee.

Flynn, W. J., Jr., Service & Inst. Mgr., Minneapolis-Honeywell Regulator Co., Tulsa.

Mc Kinney, J. T.*, Mgr., Process Equipment Co., Oklahoma City.

Rose, R. O., Sales Engr., American Blower Div., American-Standard, Tulsa.

Oregon (*Region* 4)

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Corey, L. R., Sales Engr., Brod & McClung, Portland.

Dufur, D. H., Jr., Pres., Plan Survey Center, Inc., Portland.

Fund, J. O., Tech., Johnson Service Co., Portland.

Mc Clintick, D. I., Sales Engr., Pacific Pumping Co., Portland.

Retter, C. A., Sales Mgr., Pacific Pumping Co., Portland.

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Halpin, J. J., Mech. Designer, Albert C. Wood Assocs., Philadelphia.

Rorke, W. C., Jr., Htg. Engr., Philadelphia Gas Works, Div. of U.G.I., Philadelphia.

Sawyer, A. H., Dist. Sales Mgr., Carrier Corporation, Pittsburgh.

South Carolina (*Region* 5)

Allen, R. P., Sales Engr., American Blower Div., American-Standard, Greenville.

Tennessee (*Region* 5)

Hardy, O. R., Head, Constr. & Maint. Div., The National Toddlehouse Corp., Memphis.

Pointer, E. S., Chief Engr., Cook & Nichol, Inc., Memphis.

Texas (*Region* 6)

Chamness, R. E., Engr., Burden Bros., Inc., Dallas.

Gregerson, H. G.*, Partner, Gregerson & Gaynor, Dallas.

Hui, A. S. K., Design Engr., Walter Kidde Engineers, S. W. Inc., Houston.

Miller, W. W., Jr., Sales Engr., Carrier Bock Co., Fort Worth.

Svabs, A. H., Sales Engr., Armstrong Cork Co., Dallas.

Travis, L. W., Engr., Beretta, Greenslade & Assocs., Inc., San Antonio.

Washington (*Region* 4)

Hawman, J. H., Mech. Engr., David M. Hopkins, Tacoma.

Nelsen, N. W., Mech. Engr., David M. Hopkins, Tacoma.

West Virginia (*Region* 5)

Morrison, J. W., III, Htg. Engr., The Bailey-Farrell Co., Charleston.

Wisconsin (*Region* 2)

Barry, R. E.†, Dist. Mgr., Wisconsin Power & Light Co., Berlin.

Unrath, K. M., Sales Mgr., Shellenberger-Gregg & Co., Milwaukee.

Alaska

Chandler, D. C., Owner, Chandler Plumbing & Heating, Inc., Fairbanks.

Canada (*Region* 7)

Burns, G. M.*, Mgr., Mech. & Elec. Depts., M. M. Dillon & Co., Ltd., London, Ont.

Charette, R. P., Sales Engr., Trane Company of Canada, Ltd., Montreal, Que.

Duquay, Gaston, Tech. Officer 4, Public Works Dept., Ottawa, Ont.

Fisher, Olaf, Chief Mech. Engr., Rensaa & Minsos, Edmonton, Alta.

Hobbs, H. B., Western Regl. Mgr., Bryant Manufacturing Co., Ltd., Calgary, Alta.

Holst, C. W., Mgr., Sunset Heating, Calgary, Alta.

Lacasse, J. G., Repr., The Arthur S. Leitch Co., Ltd., Montreal, Que.

Marteinson, C. A., Br. Mgr., E. H. Price (Alberta) Ltd., Calgary, Alta.

McFarlane, R. D., Supt., Industrial Sheet Metal Contractors (Alberta) Ltd., Calgary, Alta.

McQuiggin, Joseph, Mgr., Commercial Plumbing, Calgary, Alta.

Piotrowski, Edward, Mech. Cons. Engr., North Bay, Ont.

Rossoff, Clarence, Design & Dvlpt. Engr., A. E. Watts, Ltd., St. Laurent, Que.

Sinclair, G. J. R., Tech. Officer, Directorate of Works, National Defence Hdq., Ottawa, Ont.

Slovack, W. N., Br. Mgr., General Equipment, Ltd., Calgary, Alta.

Stephen, G. C., Sales Mgr., Tulloch & Stephen, Ltd., Toronto, Ont.

Young, R. G., Repr., Arthur S. Leitch Co., Ltd., Montreal, Que.

British West Indies

Lyon-Hall, R. C., Mgr., Robert C. Lyon-Hall & Assocs., Petersfield, Jamaica.

India

Punj, V. P.†, Dir., Fedders Lloyd Corp. (Private) Ltd., New Delhi.

OBITUARY

ALFRED C. BUENSOD

New York, N.Y.

Alfred C. Buensod, 71, chairman of the board, Buensod-Stacey, Inc., New York, N.Y., died at his home in Scarsdale, N.Y., on November 25th after a long illness. Mr. Buensod, a Life Member of ASHAE, had just recently been honored by election as a Fellow of the Society.

Long prominent in the contracting field, Mr. Buensod had established the Buensod-Stacey firm in 1935. In earlier years he was associated with the International Cigar Machinery Co., New York, and was a founder of Carrier Engineering Corporation, Syracuse, N.Y. He was responsible for the design, installation and operation of an air-conditioning project for the Radio Corporation of America building, a part of Radio City, New York, N.Y., which set records in the industry in 1930. Just three years ago, President Eisenhower invited Mr. Buensod to attend the sessions of the President's Conference on Occupational Safety at Washington, D.C.

Mr. Buensod was a member of *ASRE, NFPA, HP&ACCNA, Society of Motion Picture Engineers, Acoustical Society of America* and *National Association of Corrosion Engineers.*

He is survived by his wife, Irene; a daughter, Susan Jewel; and his sister, Mrs. George Watson, St. Petersburg, Fla.

AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS

Headquarters Office
62 Worth St., New York 13, N.Y.
Tel: BArclay 7-6262

(For names of Society Officers see p. 200)

Research Laboratory
7218 Euclid Ave., Cleveland 3, Ohio
Tel: UTah 1-6161

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Chapters Regional Committees: The list of members and alternate members for the 7 Chapters Regional Committees appears in the Nov. 1957 JOURNAL SECTION, p. 202.

Committee on Research: H. A. Lockhart, Chairman; E. F. Snyder, Jr., Vice Chairman.

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Two years: F. H. Faust, F. K. Hick, M.D., R. C. Jordan, H. A. Lockhart, Arthur Nutting.

One year: R. C. Chewning, W. S. Harris, N. B. Hutcheon, B. H. Jennings, P. H. Yeomans.

Technical Advisory Committees: These are subcommittees of the Committee on Research. Last published list appears in Dec. 1957 JOURNAL SECTION, p. 160.

Public Relations: B. W. Farnes, Chairman; T. V. Johnson, F. W. Brundage, J. H. Fox, E. K. Wagner.

Standards: K. T. Davis, Chairman; C. B. Gamble (one year); A. B. Algren, A. B. Newton (two years); P. N. Vinther, Albert Giannini (three years). Last list of Standards subcommittees published in August 1957 JOURNAL SECTION p. 156.

Special Committees

AAAS Representative: Walter A. Grant.

ASHAE-AIA Committee on Cooperation: John E. Haines, Chairman; John Everetts, Jr., C. B. Gamble, H. C. Hoffmann, R. J. Salinger.

ASHAE-ASRE Committee on Cooperation: ASHAE Representatives — C. B. Gamble, L. N. Hunter, E. R. Queer. **ASRE** Representatives — Cecil Boling, A. J. Hess, H. F. Spoehrer.

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Gustus L. Larson Award: L. C. Plaehn, Chairman; P. D. Gayman, Co-Chairman; B. M. Kluge, Secretary; Bert Fredericksen, F. W. Goldsmith, F. J. Nunlist, Jr., I. J. Rossiter.

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NRC—National Academy of Sciences, Div. of Engrg.: John W. James.

Nuclear Energy Engineering: R. A. Sherman, Chairman; W. F. Friend, Walter A. Grant, L. N. Hunter, H. A. Lockhart (Committee on Research).

U.S. National Committee of International Institute of Refrigeration: A. J. Hess, ASHAE Representative.

Nominating Committee[†]

Region	Member	First Alternate	Second Alternate	
1	W. C. Kruse, Jr.	E. K. Wagner	L. A. Childs	**Names designated by asterisk (*) selected by the Council; others selected by Chapters Regional Committees.**
2	John Richmond	D. S. Falk	B. M. Kluge	
3		D. M. Allen	G W. F. Myers	
4	J. E. Murray	L. A. O'Meara	R. M. Stern	
5	**R. O. McGary**	R. K. Rouse	W. G. Robertson, Jr.	
6	G. H. Meffert	J. S. Malahy, Jr.	F. R. Denham	
7	D. W. Thomson			
2	A. W. Edwards*	N. H. Peterson* (4)	E. J. Morris* (5)	
3	B. L. Evans*			
1	H. L. Martin*			
7	H. R. Roth*			

Society Organization Personnel

General Committees: The By-Laws provide for 9 such committees. The latest list appears in this issue (see above).

Research Committees: The research program is under the guidance of the Committee on Research — a General Committee. The Committee on Research appoints Technical Advisory Committees as needed. The listing appears in the December 1957 issue on page 160

Special Committees: At present there are 9 of these committees. The latest list of them and of their personnel can be found in this issue (see above).

Nominating Committee: This committee's membership is fixed by the By-Laws. The latest listing appears in this issue (see above).

Society Regional Organization: The latest listing of the names of the Regional Directors and of the members of the Chapters Regional Committees appear in the November 1957 issue on page 202

Society Chapters and Branches: The Society has chartered 70 Chapters, 1 Overseas Branch, and 6 Student Branches. These groups elect their officers and governing boards. A list of the presidents and secretaries appears in the October 1957 issue on pages 165-166

Crane Stop-Checks Mean Safer Boiler Operation

This valve cost-free for quarter century

Gate, globe, angle or stop-check—Crane steel valves are hard to beat for low-cost service on steam.

This is proved again on the installation at Scott Paper Company's West Coast Division at Everett, Wash. This Crane 300-pound stop-check has been on one of its boilers since the pulp mill was built in 1929. Working pressure: 250 psi at 450 deg. F.

Not until 1954 did this Crane No. 30XU valve need any repairs—after 25 years of steady operation with just routine maintenance. Now with new parts, it's ready to set another such record.

A single moving part: the disc—with chatter-free throttling lip—and effective disc cushioning—is one of the many reasons why Crane stop-checks have racked up this kind of service record in installation after installation. Ask your Crane Representative for full details, or write to address below.

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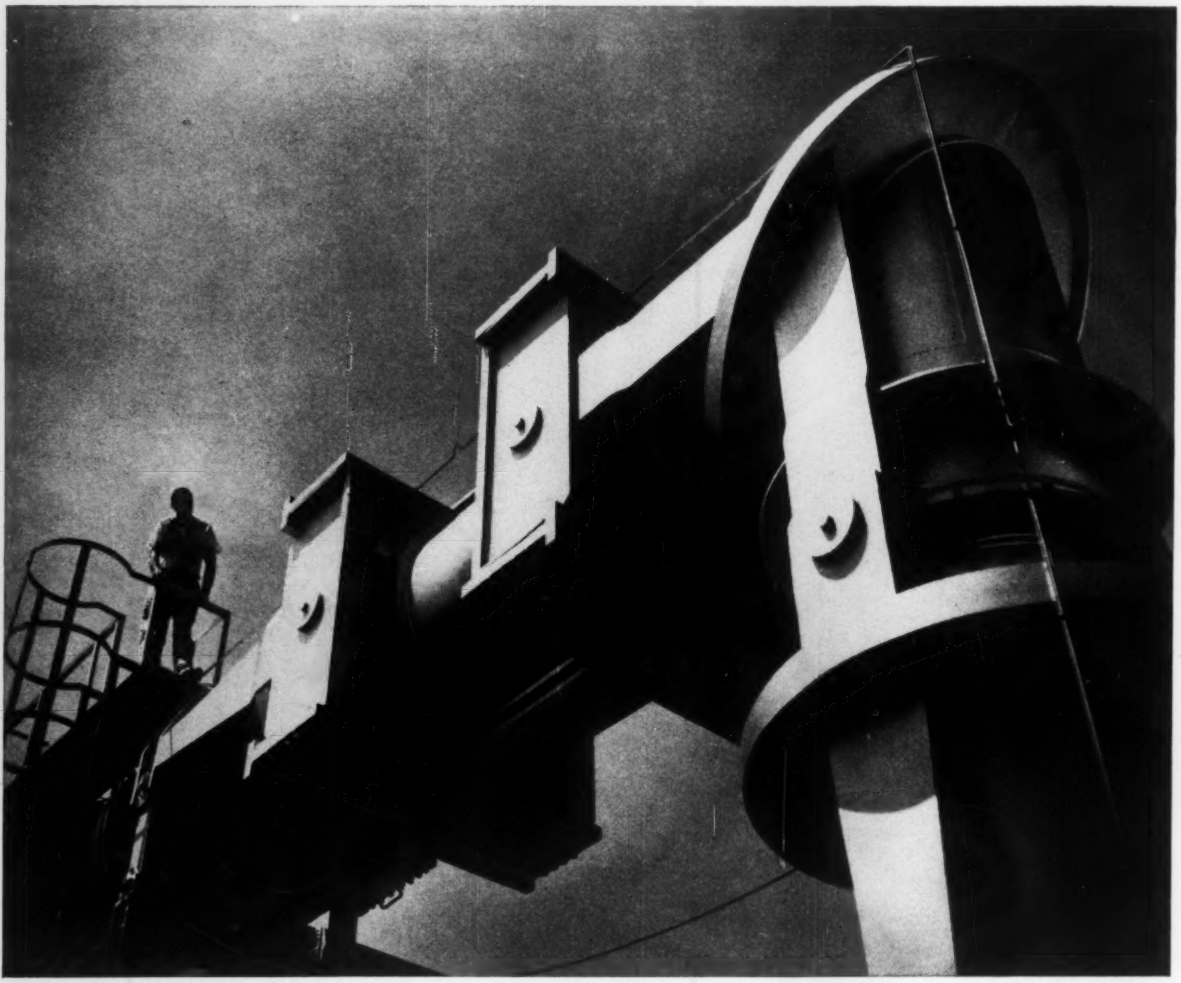

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Wind rushing through a wind tunnel at the Arnold Engineering Development Center, Tullahoma, Tenn., reaches a speed of five times the speed of sound. That is 3800 miles an hour. Under this condition, this Air Force Research and Development Command Center can test aircraft, missiles and projectiles under simulated characteristics of high-speed flight.

But the air-supply ducting grows and twists under the high temperatures and pressures of the air rushing inside. Something must absorb this movement occurring in three directions, or the ducting would buckle. Easily and efficiently, the movement is absorbed by a combination of Adsco Corruflex Hinge and Universal Expansion Joints, shown above in a section of the ducting.

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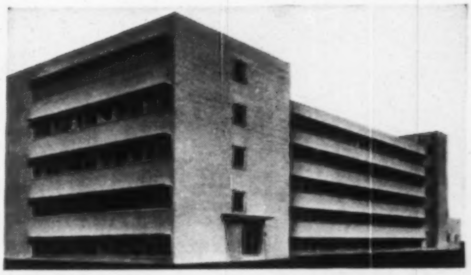
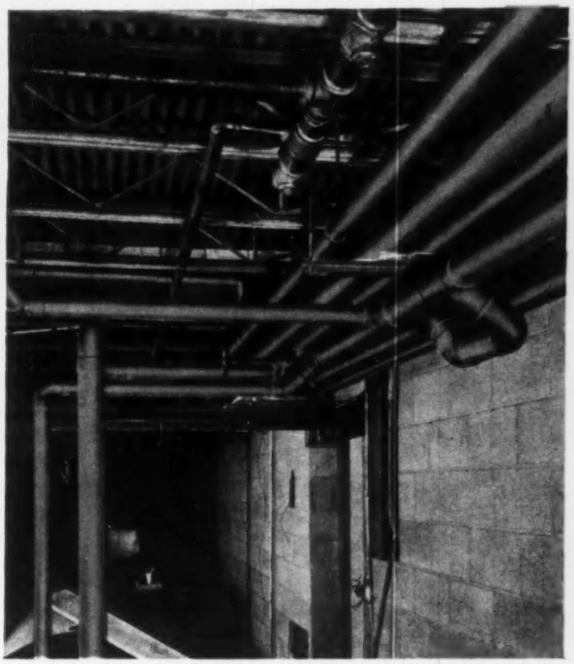


simplifies plumbing in new South Bend hospital

WATER PIPING and sanitary drainage lines of copper tube between floor and ceiling. The light weight of copper tube makes overhead work like this easier and faster. Copper tube with cast-brass solder-joint fittings was used throughout the 5-story building for the sanitary drainage system.



PARTIAL VIEW of compact copper tube installation in basement. Tight working space presents no problem with copper tube and solder-joint fittings. *Architect: John N. Marx, Chicago. General Contractor: Cornelius Pitt and Company, Chicago and South Bend. Mechanical Contractor: Allied Plumbing & Heating Co., South Bend.*

A TOTAL of 7000 feet of Anaconda Copper Drainage Tube, Type DWV, in sizes from 1¼″ to 6″, was used in the sanitary drainage system of the new South Bend, Indiana, Osteopathic Hospital. In addition, 25,000 feet of Anaconda Type L copper tube, in sizes from ½″ to 4″, was used for the hot and cold water supply lines.

In commenting on the use of copper tube for the sanitary drainage system, Mr. Cornelius Pitt, President of Cornelius Pitt and Company, general contractor, said, "It just doesn't make sense to use copper plumbing for the water supply lines and another material for the piping of the drainage system.

"The light weight and long standard lengths of copper tube, and the compact, solder-joint fittings make it much easier and faster to install. This is particularly an important economy factor in roughing-in the larger sizes required for the sanitary drainage lines of a multi-story commercial or institutional building.

"Everyone concerned with the plumbing in this ultra-modern hospital building—the owners, the plumbing contractor and our firm as general contractors—are satisfied that the claimed advantages of 'ALL COPPER' plumbing are, if anything, very much on the conservative side."

Anaconda Copper Tubes – Types K and L for water supply and heating lines; Type M and the new lighter weight Type DWV for the sanitary drainage system. Anaconda wrought and cast solder-joint fittings in types for pressure and drainage applications are available in a complete range of sizes. Write for Anaconda Publication C-33. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5753

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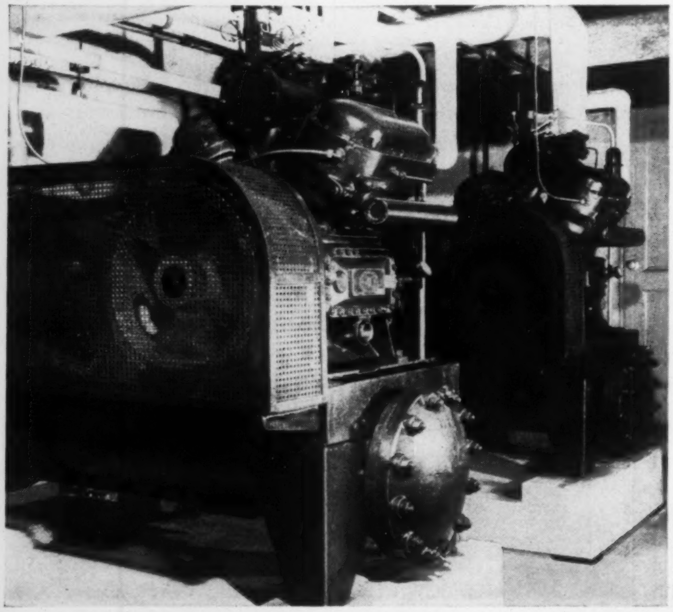
4200 Marine Drive Apartments, Chicago, Ill. Architect: Lewis Simon. Mech. Eng.: Arthur Wallace. Installing Contractors: Midwest Eng. & Equipment Co., Economy Plumbing & Heating Co.

These sixty-four new apartments at 4200 Marine Drive, in Chicago, enjoy complete air conditioning, among other advantages.

Two "ECLIPSE" refrigerating units, installed by Midwest Engineering and Equipment Co., Frick Sales-Representatives in Chicago, carry the cooling load with economy and dependability.



What are YOUR cooling needs? If you want cool air, cold drinking water, ice, freezer temperatures, or refrigeration for processing—in any commercial or industrial size—let us quote now on your requirements. Branches and Distributors in principal cities, the world over.

Frick "ECLIPSE" refrigerating units at 4200 Marine Drive Apartments, Chicago

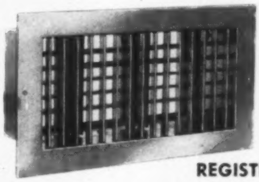
DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA., U. S. A.

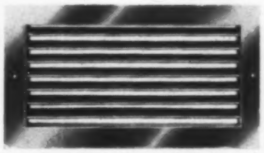
Put this idea in your file of "REGISTERS and GRILLES"

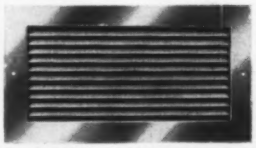
REGISTERS

KRUEGER manufactures the most complete line of Sidewall Air Distribution Registers and Grilles for Commercial Air Conditioning and Heating Applications in the field.

KRUEGER AIR CONDITIONING CORP.
19 E. RILLITO, TUCSON, ARIZONA


REGISTERS


RETURN GRILLES


DOOR GRILLES

EXTRACTORS

Write for Catalog

WHAT YOU SHOULD KNOW ABOUT
KRUEGER

1 SPECIAL ORDERS: Krueger makes registers and grilles in any style, any quantity. Call your KRUEGER representative for quotation.

2 KRUEGER SERVICE: Prompt deliveries and special attention to even small details have built the Krueger business.

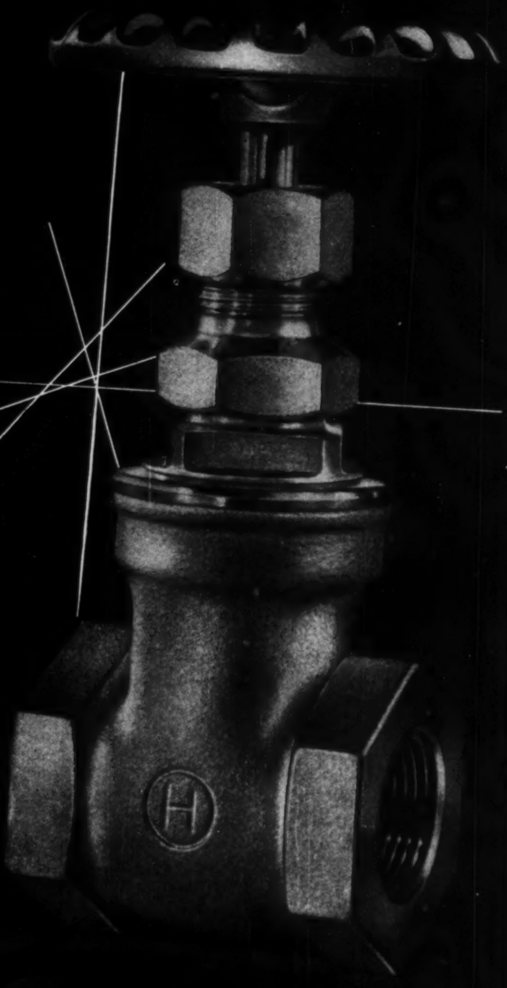
3 METAL FINISHING: All registers and grilles are shipped in a Greytone Gloss; a good looking finish ready for final coat or installation "as is".

4 SATISFACTION: Everyone from architect, engineer and contractor to owner is pleased with the appearance, performance and money-saving economy of Krueger products for all commercial buildings.

KRUEGER
AIR CONDITIONING CORPORATION

19 EAST RILLITO • TUCSON, ARIZONA • PHONE MAin 2-2805
JOBBERS IN 43 KEY CITIES

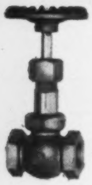
Presenting . . .
the HAMMOND
heavy-duty
bronze valve line



Now the HAMMOND line includes a broad selection of heavy-duty bronze valves . . . produced to the same high quality standards that have made HAMMOND one of the leading manufacturers of domestic plumbing and heating valves. Each HAMMOND heavy-duty valve is fully tested and meets Federal specifications. Each is backed by HAMMOND's 46 years of experience making bronze valves exclusively. Specify HAMMOND whenever you need a heavy-duty bronze gate, globe, angle or check valve. Write for our condensed catalog No. 146 and comparable valve chart. Hammond Brass Works, Hammond, Indiana.

Some typical HAMMOND high-pressure valves

#413 Composition disc globe with union bonnet and slip-on type disc holder. To 150 lbs. of steam.



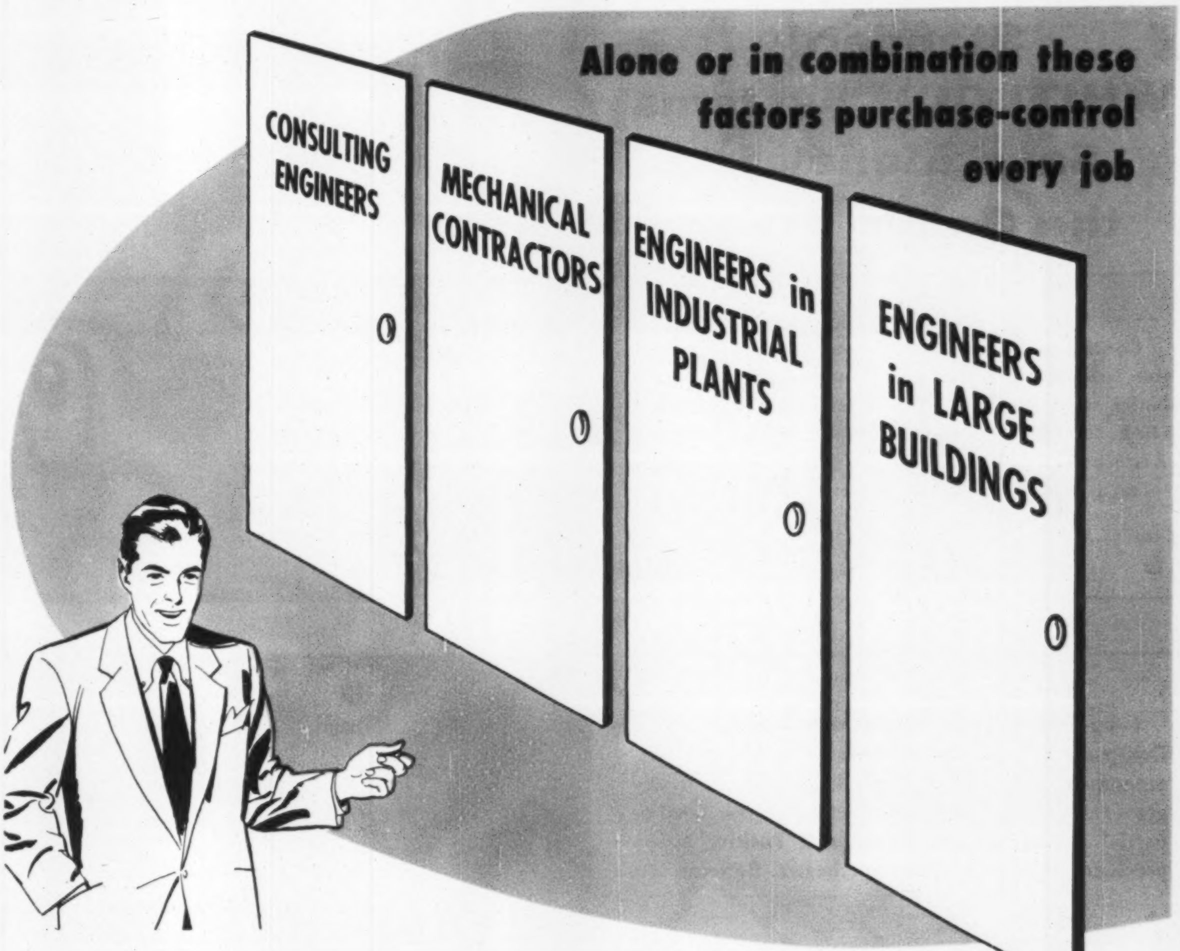
#412 Brass disc regrinding globe with union bonnet. To 300 lbs. of steam.

#610 Quick opening gate valve with cam-operated solid wedge disc. To 125 lbs. of steam.

#619 N.R.S. gate valve with solid wedge disc. To 150 lbs. of steam.

Available at your local distributor now

HAMMOND *BRITE-KOTE*® BRONZE VALVES


Alone or in combination these factors purchase-control every job
CONSULTING ENGINEERS
MECHANICAL CONTRACTORS
ENGINEERS in INDUSTRIAL PLANTS
ENGINEERS in LARGE BUILDINGS

Get through to each

to sell any product used in heating, piping, and air conditioning

Besides their undisputed control of purchasing in this field, what do these KEY factors have in common?

Collectively they are the reader-audience of Heating, Piping & Air Conditioning . . . and no other publication gets through to them like HP&AC. The fact that every copy is *paid for* gives the proof.

But the largest and only fully paid (ABC) circulation in the field isn't the only point in HP&AC's favor. It also leads its nearest rival by over 2 to 1 in advertising volume, carries more editorial pages by far, has more advertisers, and is used on an exclusive basis by more advertisers.

Conclusion: If you want truly ACTIVE and RESPONSIBLE help in getting through to your prospects, concentrate your advertising in HP&AC. It will meet *face-to-face* the engineers and contractors indicated above PLUS the field's important wholesalers and the original equipment manufacturers who are large-scale buyers of accessory products required in factory-built assemblies.

Heating Piping & Air Conditioning

ABP ABC

Heating, Piping & Air Conditioning
Air Conditioning Headquarters
KEENEY PUBLISHING CO., 6 N. MICHIGAN AVE., CHICAGO 2

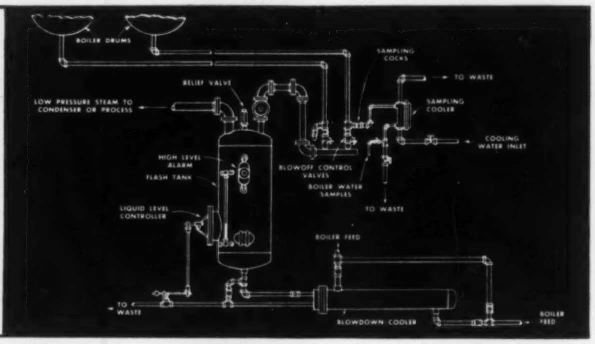
Standard WHITLOCK Systems Save Money in the Boiler Room

COMPLETE

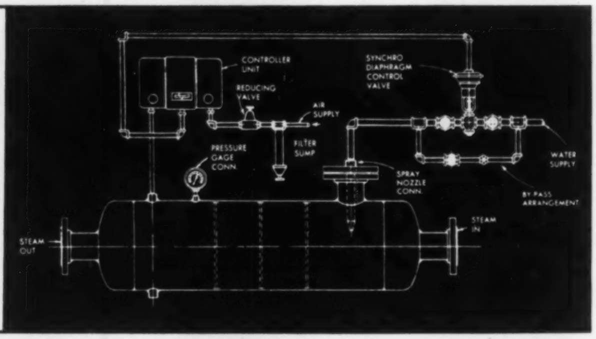
ECONOMICAL

AUTOMATIC

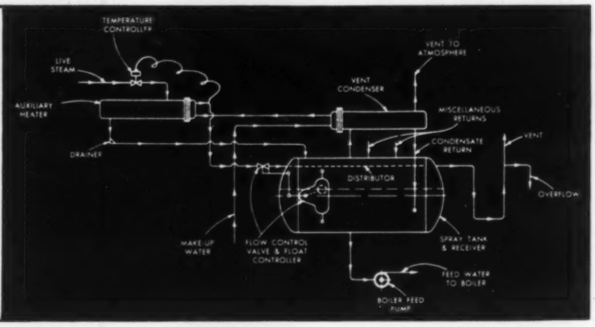
Continuous Blowdown System — Provides effective, low cost boiler protection by maintaining proper boiler water concentrations. Complete with all operating components and controls carefully selected. Accessories are standard, low in cost. Fully automatic — no attendance required. Bulletin 65.


BOILER DRUMS
SAMPLING COCKS
TO WASTE
RELIEF VALVE
LOW PRESSURE STEAM TO CONDENSER OR PROCESS
SAMPLING COOLER
COOLING WATER INLET
HIGH LEVEL ALARM
FLASH TANK
BLOWOFF CONTROL VALVES
BOILER WATER SAMPLES
TO WASTE
LIQUID LEVEL CONTROLLER
BOILER FEED
TO WASTE
BLOWDOWN COOLER
BOILER FEED

Evaporation Type Desuperheating System — Desuperheats steam and permits use of low pressure, economical equipment. Dependable over relatively great ranges of steam flow and temperatures. Total or partial desuperheating as required. Positive action precludes "flooding" of desuperheater. Bulletin 150.


CONTROLLER UNIT
SYNCHRO DIAPHRAGM CONTROL VALVE
REDUCING VALVE
AIR SUPPLY
FILTER SUMP
PRESSURE GAGE CONN.
WATER SUPPLY
SPRAY NOZZLE CONN.
BY-PASS ARRANGEMENT
STEAM IN
STEAM OUT

Deaerating Feedwater Heating System—Simple spray type system. Component units—auxiliary heater, vent condenser and spray receiver are soundly engineered, thermally and mechanically. Conservative thermal design assures full condensing of steam from spray receiver. System can be modified to take advantage of supplementary heat units from blowdown coolers or exhaust steam heaters, when available. Bulletin 120A.


TEMPERATURE CONTROLLER
VENT TO ATMOSPHERE
LIVE STEAM
VENT CONDENSER
AUXILIARY HEATER
MISCELLANEOUS RETURNS
CONDENSATE RETURN
VENT
DRAINER
DISTRIBUTOR
OVERFLOW
MAKE-UP WATER
FLOW CONTROL VALVE & FLOAT CONTROLLER
SPRAY TANK & RECEIVER
FEED WATER TO BOILER
BOILER FEED PUMP

Whitlock

These Whitlock Systems are furnished as complete "packages" and may be installed at minimum expense. Construction can be to Whitlock Standards or ASME Code for Unfired Pressure Vessels. We will gladly work with you on your cooling or heating problems. Ask us for recommendations.

THE WHITLOCK MANUFACTURING CO.
44 South Street • West Hartford 10, Conn.
New York • Boston • Chicago • Philadelphia • Detroit • Richmond

Authorized representatives in other principal cities.
In Canada: Darling Brothers, Ltd., Montreal

Designers and builders of bends, coils, condensers, coolers, heat exchangers, heaters, piping, pressure vessels, receivers, reboilers

Would YOU Contribute to an Economic Slowdown in the United States?

Of Course Not! However, when you buy materials manufactured outside the United States, in preference to quality American-made products, you are doing JUST THAT! Thousands of men who make quality American products would be thrown out of work. They'd stop spending as soon as they'd stop earning! And, as a direct result, the butcher, grocer, clothier, electrical appliance dealer, automobile distributor and builder would do less business. So would the factories that supply them. Slowing down American industry would affect your customers' business and eventually your business.

Note to Contractors:

Continue to BUY AMERICAN quality tubing and pipe—and your dollars will build new American projects . . . new markets for YOU!

READING COPPER BRASS TUBE

And RED BRASS PIPE

Sold Through Wholesalers Only

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EMPIRE STATE BLDG., NEW YORK 1, N. Y. PLANT: Reading, Pa.

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724 W. 50th St.

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4615 Perkins Ave.

OAKLAND, CALIF.
410 Hegenberger Road

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120 No. Santa Fe Ave.

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2845 Walnut St.

HOUSTON, TEXAS
1121 Rothwell St.

Wheatland Steel Pipe means Quality

...PLUS A LITTLE MORE

Wheatland gives you the finest quality steel pipe made. But Wheatland means a little *more*. It means people —men who have made pipe their life . . . your satisfaction their ultimate goal. The cold steel pipe they produce has warm concern behind it.

Yes, we sincerely believe you get *a little more* from Wheatland. Try us and see!

...pipe with the yearmark!

For information about Black or Galvanized Steel Pipe, contact

WHEATLAND TUBE CO.

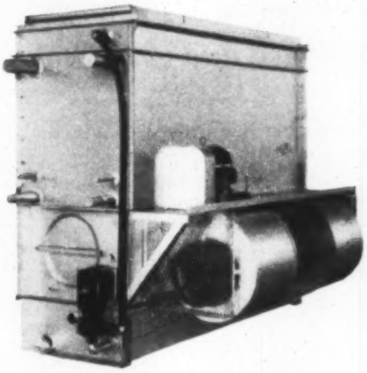
BANKERS SECURITIES BUILDING, PHILADELPHIA 7, PA.
MILLS: WHEATLAND, PA. • DELAIR, N.J.

B.A.C.

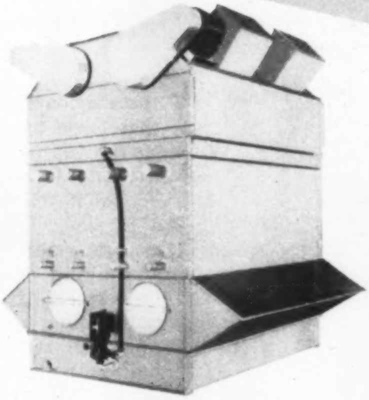
The most complete line of

EVAPORATIVE CONDENSERS
(Illustrated)
10 to 350 TONS

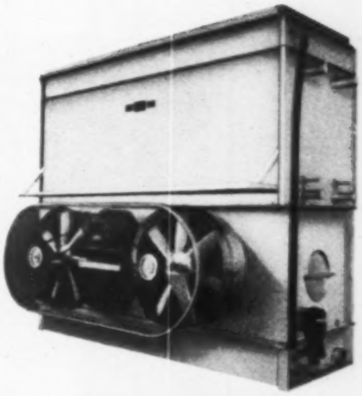
FACTORY-ASSEMBLED
COOLING TOWERS
(of similar design)
10 to 400 TONS



BLOW-THROUGH
Centrifugal Type



DRAW-THROUGH
Centrifugal Type



BLOW-THROUGH
Propeller Type

- All Hot-Dipped Galvanized Construction
- Quiet Operating (Centrifugal Fan Units)
- Low Horsepower (Propeller Fan Units)
- Condensers—Full Weight Steel Pipe Coils
- Towers—Non-Warping, Fireproof Galvanized Wet Deck Surface

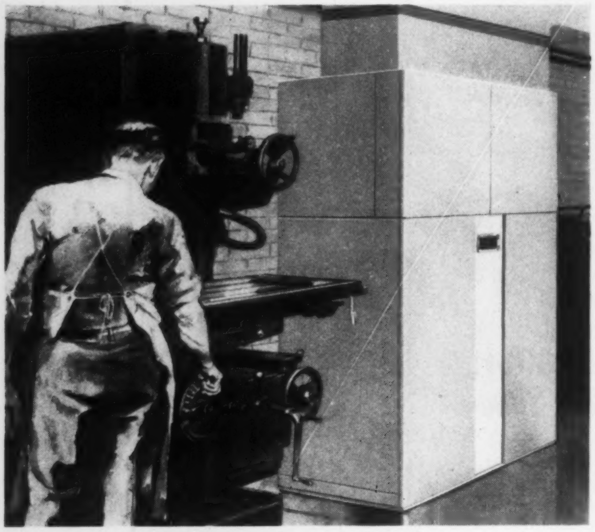
ALSO: INDUSTRIAL TOWERS to 1200 GPM
For Critical Applications—Any Approach, Any Range

BALTIMORE AIRCOIL COMPANY, INC.
BOX 7322, BALTIMORE 27, MARYLAND

GENERAL ELECTRIC TAKES A

GIANT STEP

Simplifies Air Conditioning for Big Projects . . . with New G-E Factory-Assembled Central Station Units . . . Water-Cooled and Air-Cooled



New General Electric 30-Ton Unit. Note smooth lines—no outside fan motors, filters, controls or other protruding parts. This unit is up to 2000 lbs. lighter than competitive 30-ton units. Features two G-E hermetic compressors.

Installation after installation has proved convincingly that large projects can be air conditioned *more efficiently,* at *less cost* with General Electric Factory-Assembled Central Station Units—*now available in 20, 25 and 30-ton capacities.*

Efficiency and low cost are only the beginning. Planning is greatly simplified—minimum need for fittings and piping—no elaborate equipment rooms—more free floor space. Air-cooled units (up to full 20 tons) eliminate cooling towers, water lines. Hermetic compressors minimize service problems. Installation in existing buildings requires no major alteration to premises, no serious interruption to business—and you get all the advantages of real Zone-by-Zone air conditioning.

Why not prove to yourself that it makes more sense to use General Electric Factory-Assembled Central Station Units for the big jobs. For complete data and specifications on all General Electric Commercial and Industrial Air Conditioners, write to: Mr. E. R. Pierce, General Electric Co., Commercial and Industrial Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.

Progress Is Our Most Important Product

GENERAL ELECTRIC

In Canada: Canadian General Electric Co., Ltd., Montreal

YOU CAN HAVE CONFIDENCE IN

HENRY

RELIEF VALVES

HENRY
VALVE
CO.
CONTROLLING
FLOW
SINCE 1

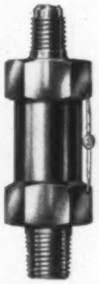
The extra capacity, the extra safety, the assurance of positive protection make Henry the choice of engineers and contractors. All Henry Relief Valves in the sizes and types listed below are constructed in accordance with the standards of the ASME. In addition these valves are stamped NB to indicate National Board Certification as to capacities.

UV ASME NB National Board Certified

FOR FREON AND SIMILAR REFRIGERANTS

TYPE 523 STRAIGHT-THROUGH RELIEF VALVE

Valve has Henry "Controlled Cushion" cup seat disc construction which prevents deformation of sealing ring and assures consistent operation. This design provides positive relief at predetermined set pressures. Brass construction. Sizes (inlet x outlet) ½" MPT x ⅝" Flare; ½" FPT x ½" FPT; ¾" FPT x ¾" FPT; and 1" FPT x 1" FPT.



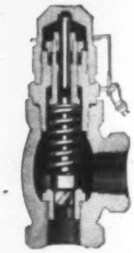
TYPE 52 ANGLE RELIEF VALVE

This forged brass relief valve is available in sizes (bottom inlet x side outlet) ¼" MPT x ⅜" Flare; ⅜" MPT x ⅜" Flare; ⅜" MPT x ½" Flare; ½" MPT x ⅝" Flare; and ⅝" ODS x ⅝" ODS.

TYPE 522 ATMOSPHERIC RELIEF VALVE

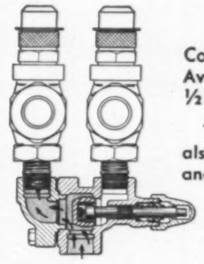
This relief valve of brass construction is for small Freon units and does not have an outlet line connection. Available with ⅛" MPT or ¼" MPT inlet connection.

FOR AMMONIA



ANGLE RELIEF VALVE

Valve has a soft metal alloy seat. Manual reseating stem permits positive emergency reseating without removing the valve from the line. Stainless steel seat insert, seat disc and main guides. Sizes (inlet x outlet) ½" FPT x ¾" FPT; ¾" FPT x 1" FPT; 1" FPT x 1¼" FPT; and 1¼" FPT x 1½" FPT.



PACKAGED DUAL RELIEF VALVE ASSEMBLY

Complies with ASME Code Requirements. Available with F.P.T. inlet connection sizes, ½", ¾" and 1".

Three-way dual shut-off valves are also available separately in various types and sizes for both Ammonia and Freon.

Packaged Assembly Simplifies Field Installation

Pressure Relief Setting Range of Henry Relief Valves, 50 to 350 PSI

WRITE FOR DATA SHEETS:

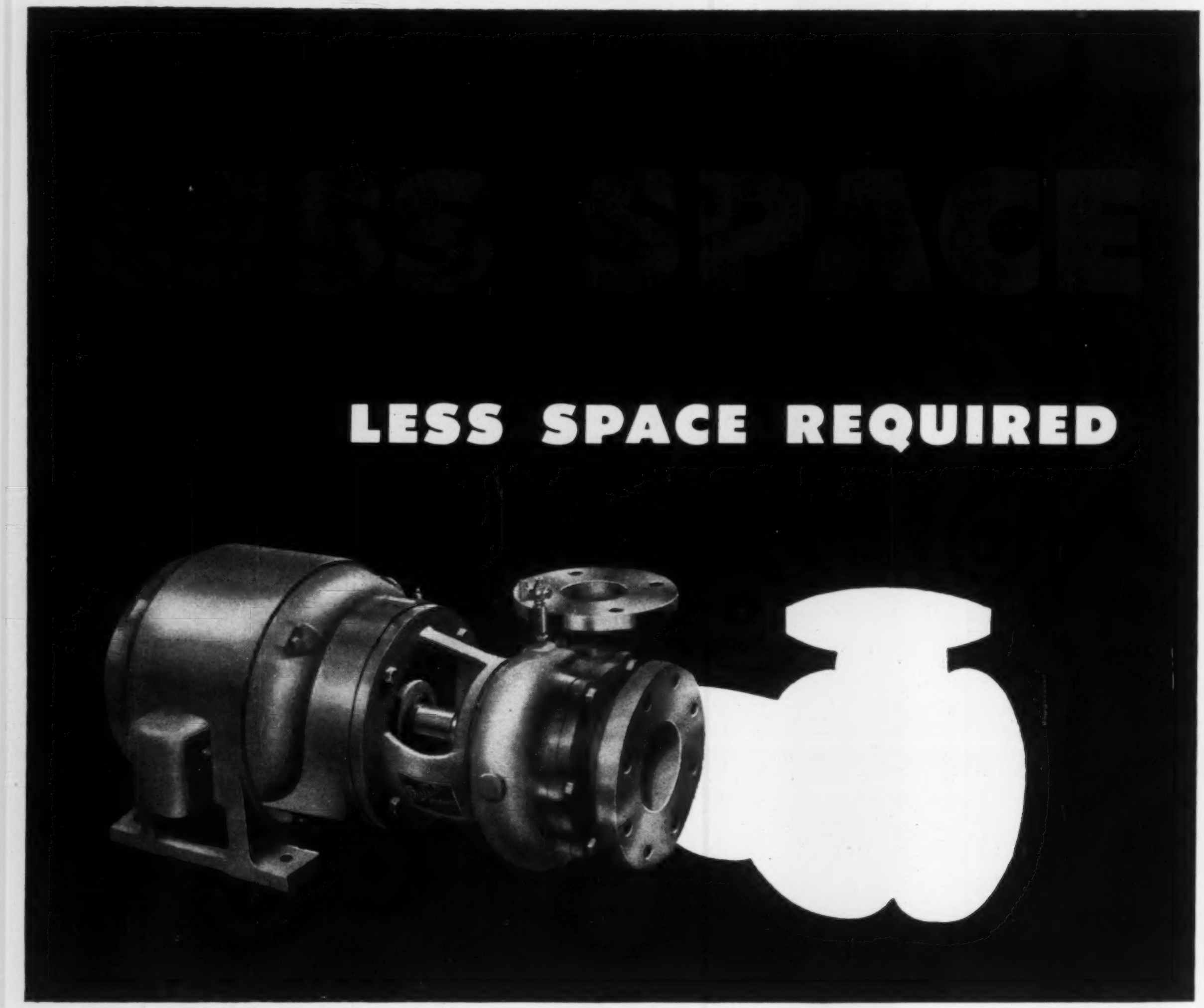
AE1303-1
Capacity ratings of Henry Relief Valves
CMC-3
A guide to the selection of Relief Devices in accordance with Chicago Municipal Code
B6-1
Henry Dual Ammonia Relief Valve Assemblies

See your Henry wholesaler for these certified relief valves.

HENRY VALVE COMPANY

Melrose Park, Ill. (Chicago Suburb) • Cable: HEVALCO, Melrose Park, Illinois

SPECIALIZED MANUFACTURERS OF THE COMPLETE LINE OF
RELIEF VALVES FOR REFRIGERATION AND AIR CONDITIONING



WHEN YOU USE "BUFFALO" CLOSE-COUPLED PUMPS

"Buffalo" CCL Close-Coupled Pumps can't be beat where space is limited. They are easy to install with permanently aligned shafts and adjustable discharge angle. This provides extreme adaptability in piping and mounting.

Thanks to 81 years of engineering experience, "Buffalo" Close-Coupled Pumps insure you a long, trouble-free life of dependable service. Their rugged construction includes heavy cast mounting brackets, sturdy shells, accurately machined impellers, and deep stuffing boxes.

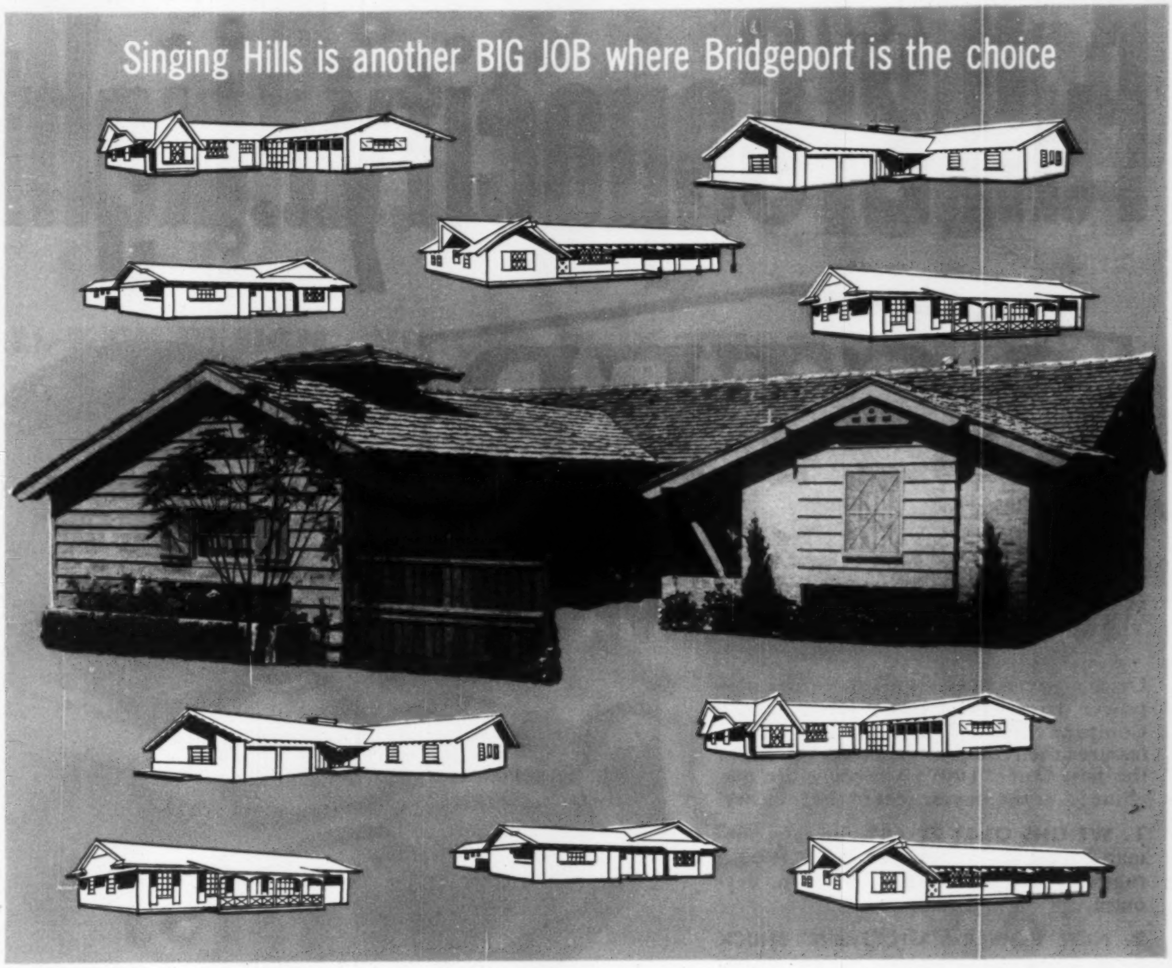
Where you need space-saving pumps, designed to deliver *extra* years of clear water service, be sure to use "Buffalo" CCL Close-Coupled Pumps, capacities to 1100 GPM. Bulletin 975-D gives you full information. Write for it today.

You're assured of value in "Buffalo" products by the "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

BUFFALO PUMPS
DIVISION OF BUFFALO FORGE CO.
171 MORTIMER STREET • BUFFALO, N. Y.
Canada Pumps Ltd., Kitchener, Ont.
Sales Representatives in All Principal Cities

"Buffalo" PUMPS

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

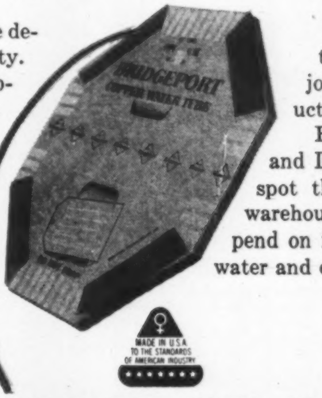

Singing Hills is another BIG JOB where Bridgeport is the choice

Typical Singing Hills home. Architect: Carter Minor. Designer: W. E. Richardson. Builders: Lacy R. Keefe Company.
Plumbing & Heating Contractor: Moorman Brothers Plumbing Company. Wholesaler: Amstan Supply Division, Dallas, Texas.

3,000 Dallas Homes Build for the Future with Bridgeport Copper Water Tube

Everything about Dallas' new and outstanding home development—Singing Hills—bears the stamp of quality. In the planned community, totaling 3,000 exceptionally beautiful homes, nothing has been spared. Setting, styles, materials—all combine to create quality throughout—homes that, in the words of the builders, "will last a lifetime."

In keeping with the "quality throughout" construction, each of the 3,000 homes will contain 170 ft. of ¾-in. and 120 ft. ½-in. Type L Hard Bridgeport Copper Water Tube.



This choice is typical of the trend to Bridgeport for the big quality jobs that require excellence of product and service.

Bridgeport delivers Copper Water and Drainage Tube on time and on the spot through a nationwide network of warehouses and wholesalers. You can depend on it. Specify Bridgeport for all your water and drainage tube requirements.

BRIDGEPORT COPPER WATER AND DRAINAGE TUBE

Bridgeport Brass Company, Bridgeport 2, Conn. • Offices in Principal Cities • In Canada: Noranda Copper and Brass Limited, Montreal

Full 2" Capacity...Light

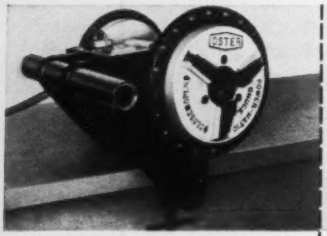
OSTER

"100" POWER DRIVE

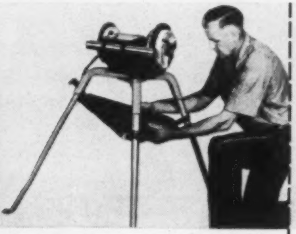
The OSTER
100 POWER DRIVE
THE OSTER MFG. CO

Oster now offers you a revolutionary new power drive—the all-new Oster "100". Compare these outstanding Oster quality features, then compare the price. You'll find the new Oster "100" gives you more machine . . . at the lowest cost in the industry!

1. **WEIGHS ONLY 77 LBS.** for easy, one-man handling. Yet the new "100" is built ruggedly to take punishing day-in, day-out use.
2. **NEW "POWER-MATIC" FRONT CHUCK** gives automatic, non-slip grip for both right- and left-hand operations. New, neoprene-bonded jaw inserts eliminate jaw sharpening . . . can be replaced quickly and easily at low cost.
3. **SELF-CENTERING REAR CHUCK** insures perfect pipe alignment for sharp, clean threads . . . provides support for longer lengths of pipe.
4. **POWERFUL NEW MOTOR**—reversible, variable-speed type—has machine-cut, hardened-steel gears mounted on ball bearings for extra long, trouble-free life.
5. **OPTIONAL ACCESSORIES,** shown below, enable you to use this versatile machine anywhere . . . thread any pipe up to 12″ diameter.



Special "C" clamp mounting makes it easy to clamp this machine to workbench, truck or other suitable mounting.



Tool tray fits snugly on lightweight tubular stand . . . puts tools within safe, easy reach.

Sturdy tripod stand folds quickly into a compact, easy-to-carry unit.

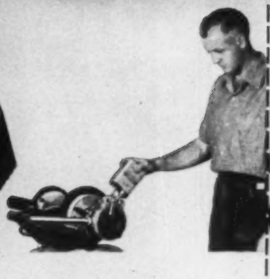
Special drive unit gives extra pipe threading range, increases capacity to 12″ pipe.

Weight....Only $185.00

ALL-NEW DESIGN...WEIGHS ONLY 77 LBS...PUTS HEAVY-DUTY POWER INTO EVERY HAND PIPE-THREADING TOOL

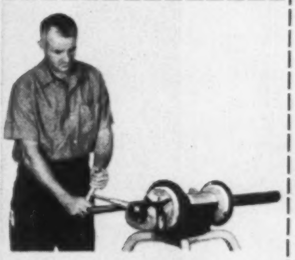
OSTER
POWER-CHUCK-MATIC
CLOSE
OPEN

Whatever the tool — die stock, reamer, cutter or pipe wrench — it's far faster, far easier when power replaces muscle to turn the pipe instead of the tool. Use the "100" Power Drive for...



THREADING

REAMING



CUTTING OFF

TURNING FITTINGS ON OR OFF

See Your Oster Distributor

THE OSTER MANUFACTURING COMPANY
1347 East 289th Street, Wickliffe, Ohio

Please rush me full details on the *new* Model "100" Power Drive and optional accessories.

Name____________________

Company Name____________________

Address____________________

City__________ Zone_____ State__________

JENKINS O.S.&Y. U-BOLT GATE

MADE BETTER THAN NEED BE . . .

Costs Less to Use

YOU PAY NO MORE for the extra quality you see in every part of a Jenkins Outside Screw & Yoke U-Bolt Gate valve. Yet longer life and reduced maintenance is bound to result from the extra ruggedness, the precision manufacture and unique design features which Jenkins puts into these popular, general utility valves.

Choose the Outside Screw & Yoke pattern for services where spindle threads must be kept out of the destructive effects of fluids in the line; where spindle threads must be cleaned and lubricated regularly or where a rising spindle is needed to indicate wedge position.

Choose JENKINS, whether O.S. & Y. or Inside Screw pattern, for valves built to save maintenance dollars.

WIDE RANGE OF JENKINS U-BOLT GATES

GET FOLDER NO. 207 which describes Inside Screw and O.S. & Y. patterns . . . Iron Body with Bronze or Stainless Steel Mounting . . . All-Iron and Ni-Resist with type 316 Stainless Steel trim. Ask your local Jenkins Distributor or write Jenkins Bros., 100 Park Avenue, New York 17.

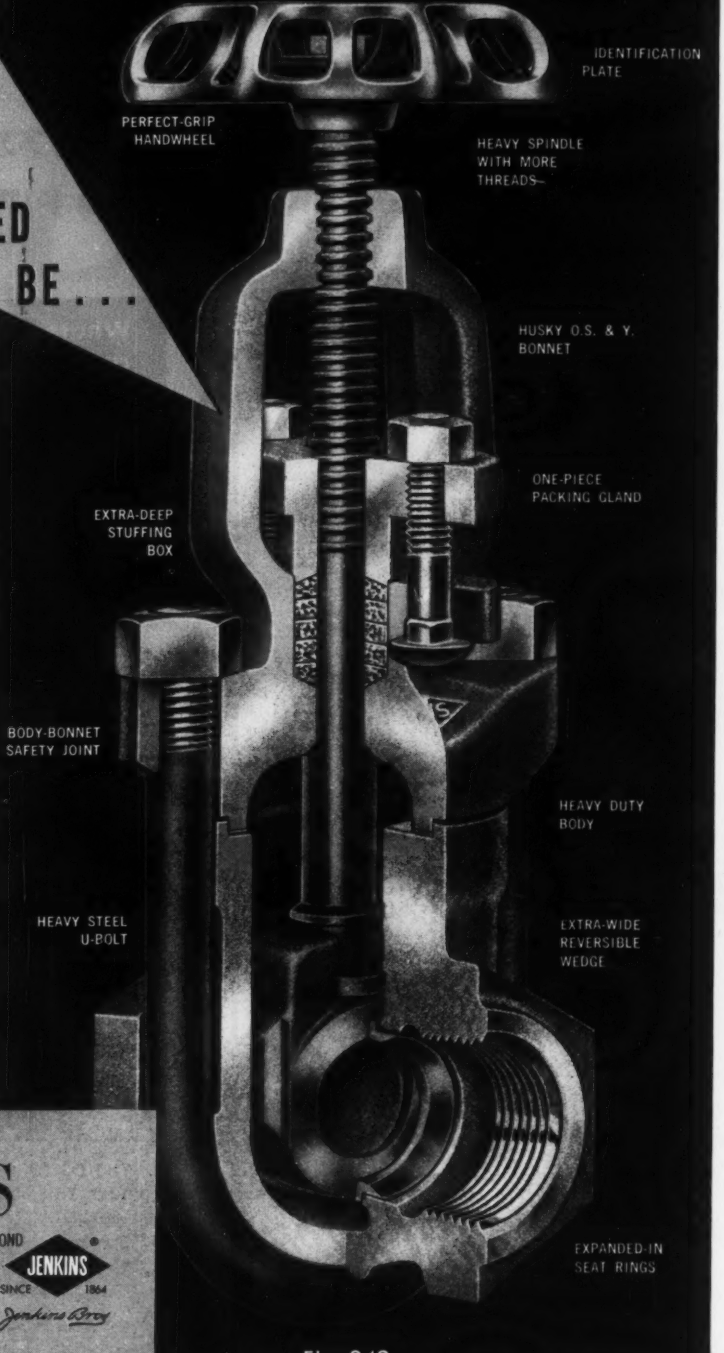

IDENTIFICATION PLATE
PERFECT-GRIP HANDWHEEL
HEAVY SPINDLE WITH MORE THREADS
HUSKY O.S. & Y. BONNET
ONE-PIECE PACKING GLAND
EXTRA-DEEP STUFFING BOX
BODY-BONNET SAFETY JOINT
HEAVY DUTY BODY
HEAVY STEEL U-BOLT
EXTRA-WIDE REVERSIBLE WEDGE
EXPANDED-IN SEAT RINGS

Fig. 242
Iron Body, Bronze Mounted

JENKINS VALVES

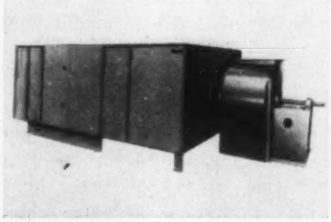
LOOK FOR THE JENKINS DIAMOND

JENKINS
SINCE 1864
Jenkins Bros

Sold Through Leading Distributors Everywhere

EQUIPMENT DEVELOPMENTS . . .

For reviews of Recent Trade Literature see Page 326



Air Handling Units . . .

. . .designed for commercial, institutional, industrial use and for process conditioning—*Trane Co., Dept. HPAC, La Crosse, Wis.*

New "Climate Changers" available in four basic units: (1) low pressure dry coil unit for comfort purposes; (2) low pressure sprayed coil unit for systems requiring all outside air; (3) high pressure dry coil unit for high pressure air conditioning systems; (4) high pressure sprayed coil unit for primary air supply of induction systems and for ventilation air conditioning on high pressure air distribution systems where all outside air is handled. Sixty-five combinations of units cover all phases of air conditioning—heating, cooling, ventilating, humidifying, dehumidifying, filtering, company says. Twelve low pressure models have capacity range 600 to 29,000 cfm; seven high pressure units range 5000 to 29,000 cfm.

Motor Bases . . .

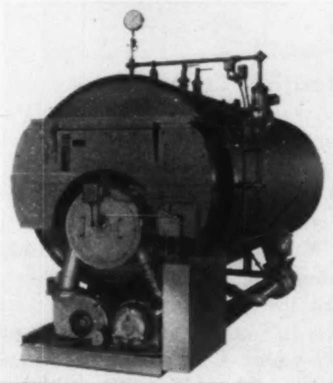
. . .designed to provide complete automatic tension control of short center belt drives to 250 hp—*American Pulley Co., Dept. HPAC,* 4200 *Wissahickon Ave., Philadelphia* 29.

"Econ-O-Matic" units control belt tension by harnessing reaction torque inherent in motor to provide proper tension on belts at every instant; drive efficiency increases, belt life lengthened, manufacturer says. Three new sizes accommodate new, old frame motors to 30 hp.

Steam Meter . . .

. . .with pressure compensating counter box—*Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Dept. HPAC,* 345 *Harris Ave., Providence* 1, *R. I.*

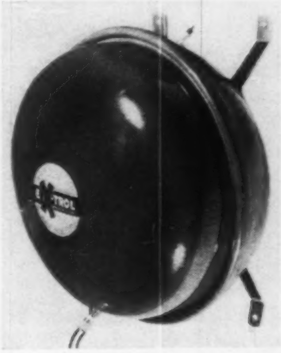
"Shuntflo" meter automatically, continuously corrects for pressure variation in steam line, registers consumption accurately in pounds of steam, company says. Small tube of unit transmits pressure changes from steam line to pressure compensating counter where compact bellows, integrating mechanism interprets these changes, produces steam consumption readings of plus or minus 2 percent accuracy, according to manufacturer. Available for 1 to 12 in. steam lines.



Packaged Boilers . . .

. . .available in ratings 4860 to 42,500 sq ft of steam—*York-Shipley, Inc., Dept. HPAC,* 500 *Jessop St., York, Pa.*

Controls of new automatic 2-pass units prewired, located in enclosed panel. Burners available for any grade of fuel oil from light to very heavy; for burning natural, manufactured, mixed gas, and to burn gas and specified fuel oil, company says. Each of 14 sizes may be furnished with either forced, induced, or natural draft.



Expansion Control System

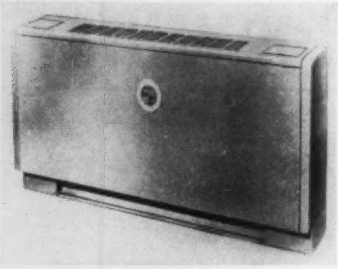
. . .designed to eliminate air troubles in hot water heating systems—*American Tube Products, Inc., Dept. HPAC, West Warwick, R. I.*

"Extrol" system eliminates cause, source of air entering heating system by embodying sealed pressurized expansion air chamber which absorbs boiler expansion but permits no contact between boiler water, expansion air, company says. New system constructed of two steel hemospheres pressed together with flexible composition butyl diaphragm in between. One side of diaphragm charged with air pressure; other side fitted with compression fitting for connection to boiler.

General Service Pumps . . .

. . .for vertical installation—*C. H. Wheeler Mfg. Co., Economy Pump Div., Dept. HPAC,* 19*th St. and Lehigh Ave., Philadelphia* 32.

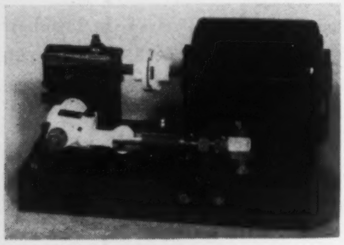
New "SDV" pumps available in sizes 1 to 3 in. with capacities ranging 10 to 400 gpm at heads of 15 to 250 ft. Units designed for brine, hot and cold water circulation, air conditioning and sprinkler systems, boiler feeding, pressure boosting. Motors carried high above floor level, pump rotors easily removed, leakage prevented by mechanical seals, company says.



Heating, Cooling Units . . .

. . . for school offices—*American Air Filter Co., Inc., Dept. HPAC,* 215 *Central Ave., Louisville* 8.

For heating, hot water piped from boiler rooms is circulated through coils of "Nelsonaire" remote units. For air conditioning, chilled water is circulated through same piping, coils. Fans draw in fresh outdoor air for ventilation which is mixed, tempered with room air, company says. Available in 200, 300, 400, 600 sizes; each model 9 in. deep, 25 in. high. New units have conveniently located manual damper controls, slant-mounted plate-fin coils, 14 gage steel primary drain pans, heavy duty 18 gage steel cabinets, according to manufacturer.



Metering Pump . . .

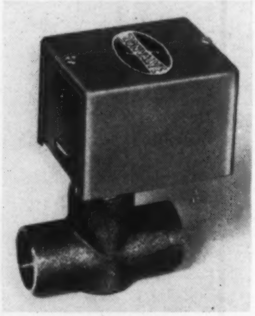
. . . for flow rates to 7880 milliliters per hr, pressures to 1000 psi—*Milton Roy Co., Dept. HPAC,* 1300 *E. Mermaid Ln., Philadelphia* 18.

New "MiniPump" has motor drive action on plunger for suction, discharge strokes. Unit has repetitive accuracy of plus 1 percent, manufacturer says. Driven by 1/3 hp motor, pump may have single or duplex liquid ends. Maximum capacities per liquid end are 300, 490, 760, 985, 1190, 1970, 3030, 3940 milliliters per hr. Capacity manually adjusted to 100 percent when unit is idle.

Steam Trap . . .

. . . designed to facilitate inspection, maintenance, installation—*Sarco Co., Inc., Dept. HPAC,* 635 *Madison Ave., New York* 22.

Entire operating element of new float thermostatic trap is one unit, which can be removed without disturbing inlet, outlet connection to semi-steel trap body, manufacturer says. Suitable for 125 psi steam pressure. Operating elements consist of stainless steel valve mechanism, copper float, bronze thermostatic air vent; engineered to provide condensate seal, prevent loss of steam. Separate air vent, requiring no adjustment when pressure changes, said to remove all air and incondensable gases, allowing no steam to escape.



Heating Control . . .

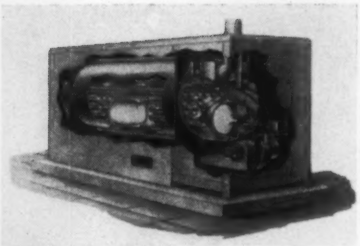
. . . designed to permit temperature control of individual plant areas, zones, offices—*Heat-Timer Corp., Dept. HPAC,* 657 *Broadway, New York* 12.

New thermostatically controlled "Zonvalve," manufactured in standard sizes, attaches to radiator; may also be installed at any point on supply piping. Unit powered by electric motor. When in open position, it automatically actuates burner or circulation, manufacturer says.

Air Filters . . .

. . . in new ½ in. metal frame size for air conditioners—*Stoddard Industries, Inc., Dept. HPAC,* 1545 *N. Kingsbury, Chicago* 22.

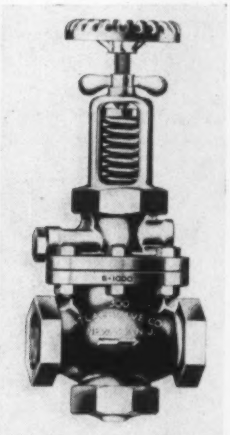
Fibers of filters maintain charge which attracts dust particles, manufacturer says. Units designed to resist humidity, excess heat. May be washed under faucets.



Oil Fired Boiler . . .

. . . designed to deliver required heat plus 480 gph of hot water — *Bethlehem Foundry & Machine Co., Dept. HPAC, Bethlehem, Pa.*

"Dynatherm Model 100" suited for heating, hot water needs required in motels, apartment houses, churches, commercial garages, company says. Completely assembled, tested at factory prior to shipment. Unit employs "Whirling Flame" principle of burning fuel in central boiler tube and transferring heat to boiler water quickly. Has baked enamel finished cabinet which stands 41 in. high, 31 in. wide, 78 in. long.



Pressure Reducing Valve . .

. . . with stellited main valve—*Atlas Valve Co., Dept. HPAC,* 280 *South St., Newark* 5, *N. J.*

New construction feature is in addition to stellited pilot valve, stellited pilot valve seat presently supplied in valve. Unit is spring loaded, piston operated, actuated by internal pilot; designed for inlet pressures to 1500 psi at 900 F and to reduce to ½ psi pressures in one stage. Models, available in ½ to 6 in. sizes, have screwed and flanged ends in bronze, cast iron and steel bodies with stainless steel and special alloy trim.

Stores Threatened with Indoor, Artificial Rain

DAIRY
EGGS
Safeway Supermarkets
Robert Hall Stores
Grand Union
Kinney Shoe Stores

These stores were threatened with indoor, continual **artificial rain.** So were their customers. Large stocks of merchandise would be soaked and ruined, timber would rot, paint peel, plaster crack **because of HUGE CROWDS!**

Each person breathes and perspires 2 ounces vapor per hour, 3 lbs. a day. An average of 200 people at a time means 400 ounces, 25 lbs. *each* hour, *all day*, which can condense into 110 quarts of water daily when vapor strikes the cold undersurface of the roof in winter. Add to this evaporation from many tons of fruits, vegetables, meats, and dairy products.

Escape vents, if sufficient, would be so extensive as to cause cold, discomfort or prohibitive fuel costs in winter, plus discomfort or exorbitant electric bills for air cooling in summer.

It was found that scientific multiple aluminum infra insulation would solve the problem, and cut heating and cooling costs considerably. Being a metal, it has practically zero permeability to vapor. Furthermore, it is continuous, without "breaks" for vapor and heat every few feet. Moreover, its scientific construction minimizes condensation formation on and in the insulation itself. Each layer of aluminum and each reflective space extends and protects for the full width of the joist space.

Being predominently large air spaces, it does not store huge quantities of either water or heat. By reflecting the heat rays outwards in summer; inwards in winter; infra insulation keeps ceilings, walls and people cool and comfortable in summer; warm and comfortable in winter, with drastic fuel savings. (*All surfaces, including those of humans and plaster, radiate heat from warm to cold.*)

Year after year, store after store of Safeway, Kinney, Grand Union, Robert Hall and many others install Infra Insulation for protection.

There's interesting reading about the causes of condensation inside building walls and the methods by which it might be prevented, in a Government pamphlet: "Moisture Condensation in Building Walls," which we'll send without charge to those who use the coupon.

THERMAL VALUES*, INFRA RECTANGULAR INSULATIONS

Non-metallic Insulation Equivalents†

	UP-HEAT	DOWN-HEAT	Cost, Installed§
TYPE 2	C .177=1⅘"	C .064=5⅕"	5¢ sq. ft.
TYPE 3	C .142=2⅓"	C .049=**6¾"**	6¢ sq. ft.
TYPE 4	C .105=**3⅕"**	C .042=**8"**	8¢ sq. ft.
TYPE 5	C .081=4"	C .034=9⅔"	10¢ sq. ft.
TYPE 6	C .068=4⅘"	C .034=9⅔"	11¢ sq. ft.
TYPE 9	C .043=**7¾"**	C .029=**11¼"**	16¢ sq. ft.

Types 1, 7, 8 also available

*Determined by method of National Bureau of Standards in H.H.F.A. Research Paper 32.

†Calculated on bas.s of limiting thermal values cited in Fed. Specs. LLL-f-321b; HH-I-585; HH-I-521c; HH-I-551a.

§Approximate cost, material and labor, new construction between wood joists.

CAN BE PURCHASED THROUGH YOUR PREFERRED LOCAL DEALER

Infra Insulation Inc., 525 Broadway, N.Y.C. Dept. H-1
Please send National Bureau of Standards Booklet BMS63.

NAME____________________

FIRM____________________

KIND OF BUSINESS____________________

ADDRESS____________________

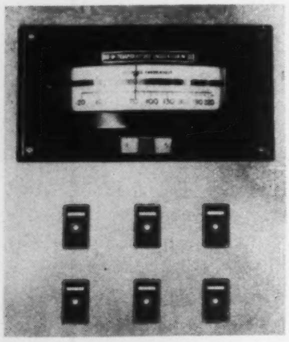
EQUIPMENT DEVELOPMENTS

Continued

Baseboard Heaters . . .

. . .in new 4 and 6 ft lengths—*Westinghouse Electric Corp., Dept. HPAC, Box* 2099, *Pittsburgh* 30.

New electric units installed along wall in place of baseboards. Maximum temperature of vertical outer surface is just above normal body temperature, manufacturer says. Control panel is coupled into heating system of each room, allowing room-by-room use, conservation of heat. Power source of 240 volts a-c required. Rated at 250 watts per ft, units stand 7 in. high, 2⅝ in. wide.



Remote Thermometer . . .

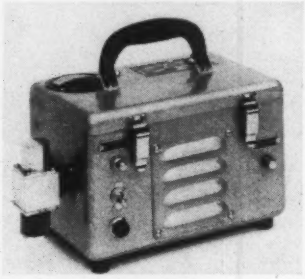
. . .designed to indicate temperatures of remotely located check points throughout building's heating, air conditioning system—*Barber-Colman Co., Dept. HPAC,* 1300 *Rock St., Rockford, Ill.*

Electronic unit consists of indicating meter, bridge and power supply, sensing elements, selector switches. Wire resistance elements remotely located, connected to corresponding switch on central panel. Room, duct, immersion, outdoor sensing elements available. Adaptable to cabinet, panel mounting.

Globe Valve . . .

. . .for handling acids, alkalis—*Manning, Maxwell & Moore, Inc., Dept. HPAC,* 250 *E. Main St., Stratford, Conn.*

Unit has disc facing made of slightly plasticized polyvinyl chloride that retains corrosion resisting properties, pressure, temperature ratings, other characteristics of the pure polyvinyl chloride valve body, manufacturer says. Resiliency said to meet many valve seating requirements. Available in ½ through 3 in. sizes with service ratings 125 psi, 145 F.



Gas Alarm . . .

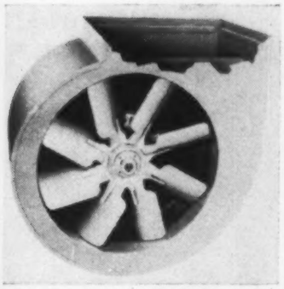
. . .with new visible indicator meter —*Johnson-Williams, Inc., Dept. HPAC,* 2715 *Park Blvd., Palo Alto, Calif.*

"Sentinel" designed for confined area use features externally mounted, plug-in filament unit for response to gases. Typical application would be welding operations in confined areas that have contained flammable liquids, company says. Battery charger is separate unit. Remote detector, alarm light for noisy locations, sample drawing attachment available as optional modifications.

Duct Tape . . .

. . .for sealing ductwork, insulation on heating, air conditioning installations—*Duro-Dyne Corp., Dept. HPAC,* 800 *Third Ave., New Hyde Park, Long Island, N. Y.*

Infrared, high temperature curing process gives product ability to provide extra holding power under extreme temperature conditions for virtually unlimited time, manufacturer says. Available in aluminum cloth, aluminum reinforced fiber series. Tapes are plastic coated; come in rolls 60 yards long.



Mixed Flow Blower . . .

. . .for furnace, air conditioner applications — *Torrington Mfg. Co., Dept. HPAC, Torrington, Conn.*
not be changed for operation in another system, manufacturer says.

Four models cover flow range 500 to 1500 cfm against typical back pressures. Flat power curve permits impellers to run at any operating point with same motor; motor need
Also, motor is supported at its center of gravity.

Nozzle . . .

. . .designed for roof cooling—*Bete Fog Nozzle, Inc., Dept. HPAC,* 309 *Wells St., Greenfield, Mass.*

New "RC-1" gives coverage of 16 ft diameter or approximately 300 sq ft per gpm at operating pressure of 10 psi, manufacturer says. Unit employs spiral principle for producing spray; made from single piece of brass material.

Air Conditioners . . .

. . .in 17 new models—*Airtemp Div., Chrysler Corp., Dept. HPAC,* 1600 *Webster St., Dayton* 1, *Ohio.*

Sizes include two ½ hp units; five ¾ hp; eight 1 hp; one 1½ hp, one 2 hp. Large grilles, spacious filter areas, quietness of operation, new mounting kits among features cited by manufacturer.

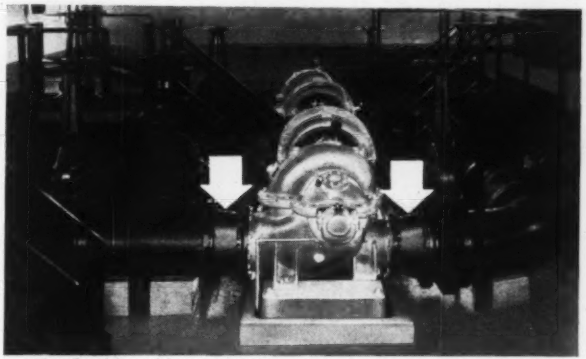
EXPANSION JOINTS

Expanding the Designer's Scope

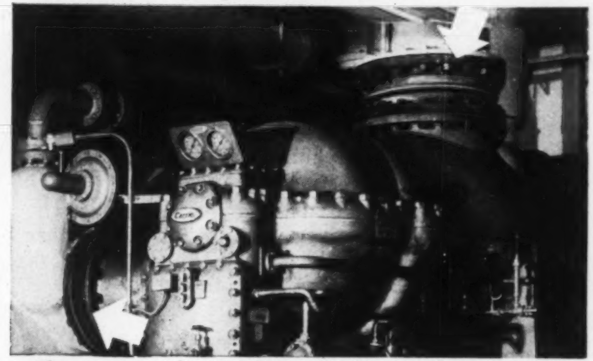
U. S. Rubber Expansion Joints are resilient and therefore do not, like metal, set permanently when compressed. Constant flexing merely keeps them alive... prevents brittleness.

- They absorb both axial and lateral deflection far more than metal joints. Greater insulation against vibration and pump noises. No electrolysis, corrosion or erosion.
- Handle pressures from 40 lbs. to 125 lbs.
- The outside diameter of the arch is smaller than on metal joints. (Face-to-face dimensions, even with multiple arches, are smaller.)
- Weight is much less. This, plus the fact that no gasket is needed between flanges (metal joints require gaskets) results in an easier installation lowering the cost.

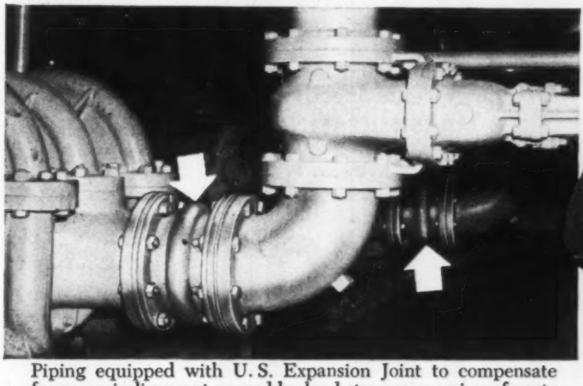
"U. S." was the *first* to develop expansion joints. They are at work in every kind of industry, prolonging the life of equipment in pressure or vacuum pipe systems. Some are still in service, after 30 years of operation. Obtainable at any of the 28 "U. S." District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.



The flexible rubber expansion joints on the centrifugal pump installations (above) are made by U. S. Rubber. They prevent stresses caused by expansion and contraction.



This compressor has U. S. Expansion Joints on the suction and discharge lines. Like all U. S. Joints, these insulate against the transfer of vibration and noise.

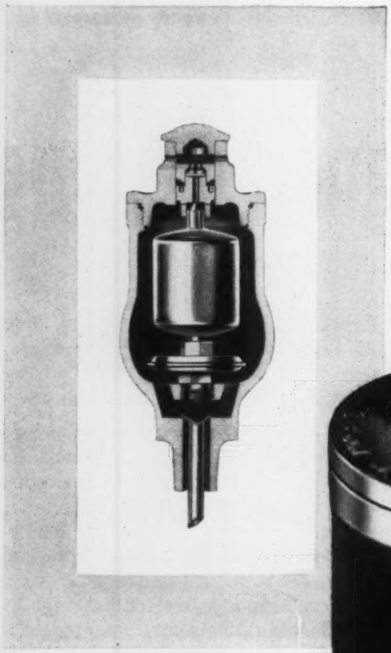


Piping equipped with U. S. Expansion Joint to compensate for any misalignment caused by load stresses, wearing of parts or settling of building.

For the complete technical information catalogue on the entire line of U. S. Rubber Expansion Joints, contact your nearest "U. S." District Sales Office or write us at Rockefeller Center, New York 20, New York.

Mechanical Goods Division

United States Rubber



No. 5 Rapid Vent. Float and thermostatic construction. Designed for use at the end of steam mains, tops of risers and other similar locations on vapor and one pipe vacuum systems where the maximum venting requirement does not exceed one cubic foot per minute at 5 psi.

No. 6 Quick Vent. Thermostatic only. Designed for installation at high points in the piping where there is not sufficient room for the No. 5 Vent or where a float is not needed. Same venting capacity as No. 5.

No. 50 Air Vent. Float only. Designed to remove air and gases automatically from hot or cold water tanks, coils or piping, liquid pump systems or similar applications where it is necessary to vent air rapidly. Maximum working pressure, 125 psi.

No. 55 Air Vent. Float and thermostatic construction. Is capable of expelling large volumes of air without passage of water or steam and is designed for use on steam pressure vessels or systems. Maximum working pressure, 125 psi.

No. 7 Air Eliminator. Float and thermostatic construction. Expecially suitable for installation at the ends of steam mains, return piping and tops of risers where it is necessary to expel a large volume of air from the system. Suitable for working pressures up to 15 psi.

A well placed air vent can work a heating miracle!

In a Wilmette Illinois Building, an outwardly well-engineered vacuum system had been a headache for years. Then, last winter, along came a heating man who quickly sized up the situation and said with real conviction: "Put a Marsh No. 5 Vent right there!"

That did it! One inexpensive vent cleaned up a spotty, erratic condition, that a number of expensive alterations had failed to touch.

Unusual? Not in the least: over the years we have seen a lot of wonders worked by installing the right kind of Marsh air vent in the right spot. A number of these dependable vents are illustrated here . . . products that express an unrivaled accumulation of knowledge in dealing with air venting problems.

Marsh air vents are fully covered by the Marsh Heating Specialty Catalog along with Marsh Traps and Valves. Your local Marsh man will be glad to work with you in applying Marsh Vents effectively.

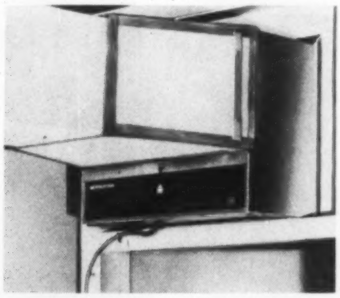
MARSH HEATING EQUIPMENT CO.
Sales Affilate of Jas. P. Marsh Corporation
Dept. T, Skokie, Ill.
Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd Street, Edmonton, Alberta, Canada

MARSH

Quality Heating Specialties since 1865

EQUIPMENT DEVELOPMENTS

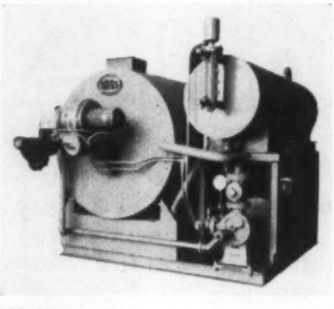
Continued



Air Conditioner . . .

. . .for small stores, offices—*Westinghouse Electric Corp., Dept. HPAC, Box* 2278, *Pittsburgh.*

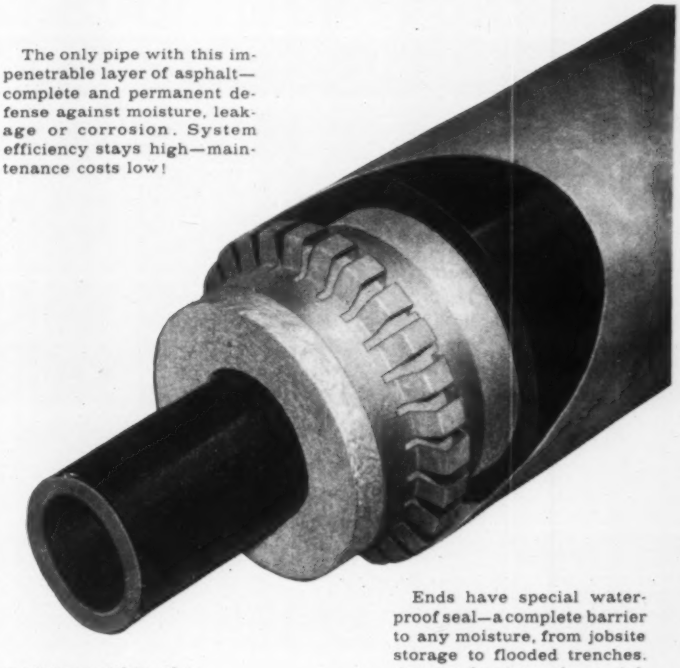
Company says new 2 hp "Ductaire" maintains cool comfort regardless of outside temperatures, keeps room air continually on move, removes moisture as it dry-cools air. Unit designed to take out objectionable smoke, odors as it removes to 25 percent of total air flow capacity. Said to air condition to 1400 sq ft of floor space, deliver 590 cu ft of cooled air per min. Kit of six 4 ft sections of prefabricated ductwork, two vent grilles available with product.



Oil Heater . . .

. . .designed to produce rapid high temperatures automatically at low pressures—*Bros Boiler & Mfg. Co., Inc., Dept. HPAC,* 1057 *Tenth Ave., S. E., Minneapolis* 14.

"Hi-Heat" generates temperatures to 500 F; operates at pressures below 15 psi, company says. New unit has all electric control system mounted in centralized, weatherproof control box. Electrical system contains performance controls. Operates with light, heavy oil; gas; combination of latter. Five models available with outputs 1,050,000 to 3,650,000 Btu per hr.



The only pipe with this impenetrable layer of asphalt—complete and permanent defense against moisture, leakage or corrosion. System efficiency stays high—maintenance costs low!

Ends have special waterproof seal—a complete barrier to any moisture, from jobsite storage to flooded trenches. An exclusive plus with Durant!

Pipe rotates within the casing to permit faster, lower-cost top-position welds. Simple field joint completes the installation!

Pre-insulated and prefabricated in standard lengths—ready for laying in an ordinary graded trench. Lowers installation costs because it needs no special masonry, underground supports, backfills or sub-drains.

PRE-SEALED DURANT INSULATED PIPE

is clear proof that not all underground pipe is the same. Factory pre-insulated and prefabricated D.I.P. has low original cost... costs far less to install...and is the only conduit with an integral moisture and corrosion barrier that guarantees minimum maintenance cost for years to come!

IF YOU SPECIFY, INSTALL, OR BUY INSULATED PIPE—YOU NEED ALL THE FACTS ON D.I.P.
WRITE TODAY FOR YOUR COPY OF CATALOG #35—THE FULL 54-PAGE STORY
NO OBLIGATION

D.I.P. D.I.P.*

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STAFF ENGINEERS AND REPRESENTATIVES IN PRINCIPAL U. S. CITIES & IN CANADA TO SERVE YOU

Dependable heating begins with the wiring...

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plasticord-plasticote®

WIRES and CABLES

—including

Flexible Steel Conduit

TW Building Wire

Non-Metallic Sheathed Cable

Appliance, Instrument Wire

Oil Burner Ignition Cable for damp locations—special construction resists deterioration due to oil, grease, grit. This Chester oil burner ignition cable is UL approved.

POLYETHYLENE INSULATION
VINYL PLASTIC
STRANDED COPPER CONDUCTOR

Braided or Jacketed Thermostat Cable—multi-conductor wire for temperature control. Features flexible Vinyl jacket or waxed cotton overbraid for trouble-free circuits.

SEMI-RIGID VINYL PLASTIC
SOLID COPPER CONDUCTOR
FLEXIBLE VINYL JACKET OR WAXED COTTON OVERBRAID

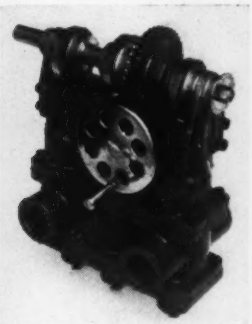
Armored Bushed Cable—available in standard wire sizes both solid and stranded in single, two, three and four conductors. Armored lead cable furnished in standard wire sizes.

GALVANIZED STEEL ARMOR
ANTI-SHORT BUSHING
WAXED CRAFT PAPER
VINYL PLASTIC OR RUBBER INSULATION

Super-rugged Chester Insulations resist Oil, Grease, Water, Grime—

Chester Plasticote and Plasticord coatings withstand severe environmental conditions... add years to wiring life The smooth pliability of these durable Chester conductors makes them easier working, faster to install For faster installations and improved wiring performance, connect it with Chester! All wire and cable constructions *exceed* service requirements. Call or write for wire samples and bulletins today.

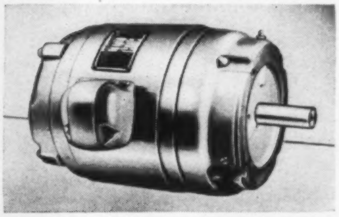
CHESTER CABLE CORP.
20 HILL STREET, CHESTER, NEW YORK
A Subsidiary of Miami Copper Company



Purge Sequence Valve . . .

. . . for industrial boilers — *Atlas Valve Co., Dept. HPAC,* 280 *South St., Newark, N. J.*

Unit provides secure, hazard free means of steam purging or scouring oil burner tips in industrial installations, company says. Device is triple interlocked valve system actuated by single handwheel. It dictates inflexible, irreversible sequence in control of atomizing steam fuel oil, steam for purging burner tips.



Footless Motor . . .

. . . designed for direct connection to driven equipment — *U. S. Electrical Motors, Inc., Dept. HPAC,* 200 *E. Slauson Ave., Los Angeles* 54.

Unit supplied with NEMA style "C" bracket for automatic alignment, available in ratings 1 to 30 hp. "Ventrifoil" deflector directs air and deflects water; cast iron, one piece frame heat treated to prevent warpage; windings asbestos protected, company says.

Stainless Steel Coupling . .

. . . for fractional horsepower motors —*Eco Engineering Co., Dept. HPAC,* 12 *New York Ave., Newark* 1, *N. J.*

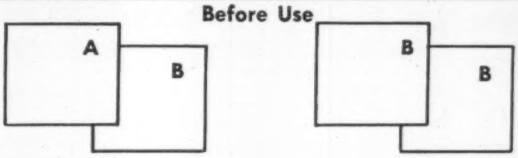
New unit is one of first to be made available for corrosive atmospheres,

air, smoke, gas, filtration problems?

Find out how remarkable, new, 100% nylon NY-SUL-LOFT* turned one firm's problems into profits!

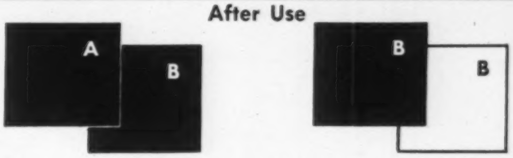
Seeking an answer to rising maintenance and filter replacement costs, a large industrial and office building air conditioning service company conducted the following impartial, on-the-job test:

Before Use



1 Two filter media were placed in operating position, under identical operating conditions. One was an ordinary, widely-used material, (A). The other was new Ny-Sul-Loft, (B). Behind each was placed a second Ny-Sul-Loft filter.

After Use



2 After the usual interval between replacements the outer filters were removed. The piece of Ny-Sul-Loft behind the ordinary filter was black. The one behind the Ny-Sul-Loft was still clean and white!

Saves Time and Money

Ny-Sul-Loft *proved* itself superior to the best filtering material this company had found. It proved that by reducing the frequency of service calls it could place the company in a better competitive position — a position where it could serve more customers, *more profitably!*

If you are a filter manufacturer, a manufacturer of air conditioning or air purification equipment — or a design engineer working in these fields — Ny-Sul-Loft can solve *your* problems in cooling, heating or purifying air. Send for samples and test them NOW!

*Pat. applied for

STAR WOOLEN COMPANY
Dept. A Cohoes, N. Y.

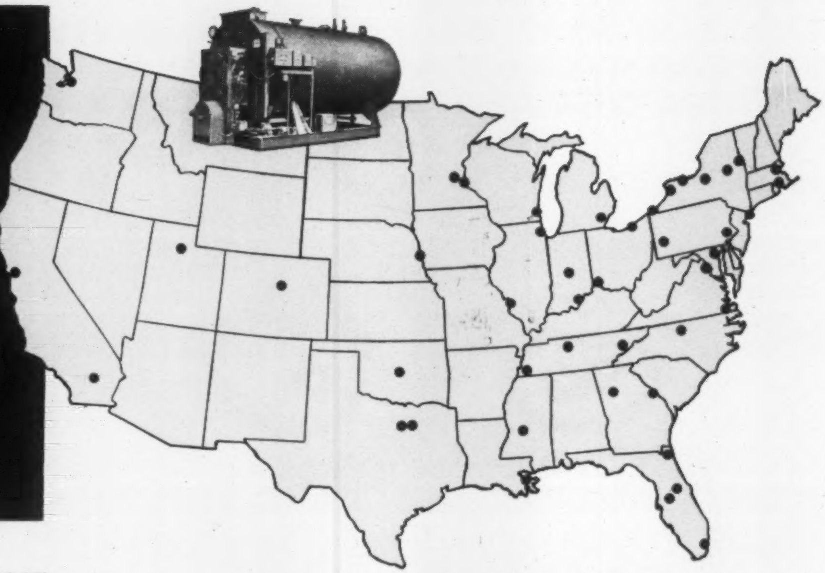
Ny-Sul-Loft is a 100% nylon material, its fibers permanently welded into minute, resilient "springs." It is resistant to a wide range of alkalis, acids and other chemicals which do not react with nylon. Available in standard formulation or engineered for your specific requirements.

STAR WOOLEN CO., Dept. A Cohoes, N. Y.
Send samples and specifications of Ny-Sul-Loft immediately to:

NAME ....
TITLE ....
COMPANY ....
ADDRESS ....
CITY .... STATE ....

CUT COSTS WITH

Continental Boiler Service Coast to Coast



The basic fundamentals of learning are the ABC's. Therefore, when your subject is boiler service — Continental Boiler Service — we believe it essential that you become familiar with the ABC's of Continental Service from coast to coast as follows:

A . . . Aid and Supervision in Start Up.

B . . . Boiler Operating Instruction to Attendants.

C . . . Competent and Dependable Service, if Needed.

As you can see, in its basic and practical application, SERVICE means more than just a willingness to help you before the sale.

That is why so many heating and power plant engineers prefer the Continental Automatic Boiler. For the Continental field organization is built around experienced boiler sales and service personnel. These men have a real stake in your complete satisfaction.

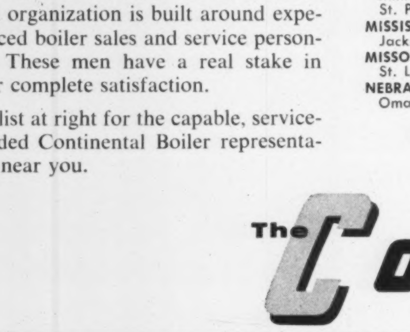
See list at right for the capable, service-minded Continental Boiler representative near you.

Distributors of Continental Boilers

CALIFORNIA
El Cerrito—American Engineering & Mfg. Corp.
Palm Springs—Pacific Engineering Equipment Co.
COLORADO
Englewood—Champion Specialty Co.
FLORIDA
Jacksonville—H. L. McMurry & Co.
Miami—H. L. McMurry & Co.
Orlando—H. L. McMurry & Co.
Tampa—H. L. McMurry & Co.
GEORGIA
Atlanta—Atlanta Distributing Co.
Atlanta—Mechanical Associates
Augusta—Tarte Boiler Repair Co.
ILLINOIS
Chicago—Automatic Steam Sales Co.
INDIANA
Indianapolis—Plibrico Sales & Service Co.
New Albany—Falls Cities Boiler & Machine
LOUISIANA
New Orleans—Cressy Sales Company
MARYLAND
Baltimore—Heating Services, Inc.
MASSACHUSETTS
Dorchester—Lewis National Corp.
MICHIGAN
Dearborn—Kramer & Associates, Inc.
MINNESOTA
Minneapolis—Oil Burner Service Co., Inc.
St. Paul—Lincoln Equipment Company
MISSISSIPPI
Jackson—Climate Engineers, Inc.
MISSOURI
St. Louis—Continental Boiler & Sheet Iron Works
NEBRASKA
Omaha—Midwest Utility Service Co., Inc.
NEW YORK
Buffalo—W. J. Clark Equipment Co.
Gloversville—Olin T. Caldwell & Co.
Hudson Falls—Boiler Equipment Co.
New York—Thermal International, Inc.
Rochester—Ernest J. Rookey
Syracuse—U & S Supply Corp.
NORTH CAROLINA
Greensboro—M. G. Newell Co., Inc.
OHIO
Cincinnati—Kenneth B. Little Co.
Cleveland—M. G. Limbach Company
OKLAHOMA
Oklahoma City—Mecha-Line Co.
PENNSYLVANIA
Erie—Belco Supplies
Phoenixville—Besco Sales, Merrill A. Squier
Pittsburgh—John C. Gregg Company
RHODE ISLAND
Providence—Weatherall Engineers, Inc.
TENNESSEE
Knoxville—Boiler Supply Co.
Memphis—Middle States Associates, Inc.
Nashville—Boiler Supply Company
TEXAS
Dallas—Rodgers Engineering Co., Inc.
Fort Worth—J. P. Philibert
UTAH
Salt Lake City—Power Engineering Company
VIRGINIA
Arlington—Charles C. Plummer
Suffolk—C. Fred Bailey
WASHINGTON
Seattle—International Sales Corp.
WISCONSIN
Milwaukee—Industrial Steam, Inc.

BOILER ENGINEERING & SUPPLY COMPANY, INC.
8 Manavon Street, Phoenixville, Pa.

The Continental AUTOMATIC BOILER



Cut-away view of typical Series A Continental Automatic Boiler, firing oil and/or gas. Other models from 20 to 500 hp, with on-off, low-high-low or modulating controls. For steam heating or process work at pressures from 15 to 250 pounds, or for hot water heating at low or high temperatures.

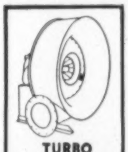
A HALF CENTURY OF BOILER MANUFACTURING EXPERIENCE

Air Requirements
BY GENERAL

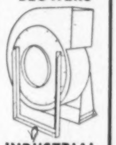
Above:
WILSHIRE
BUILDING
Los Angeles

CERTIFIED RATINGS
AUTHORIZED BY
NAFM

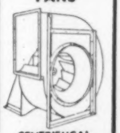
BACKWARD BLADE
NON-OVERLOADING
CENTRIFUGAL FAN



TURBO
BLOWERS



INDUSTRIAL
FANS



CENTRIFUGAL
FANS
BACKWARD BLADE
FORWARD CURVE

GENERAL
BLOWERS ARE
CUSTOM
ENGINEERED

Thirteen stories of handsome, wall curtain construction, the beautiful Wilshire Building is fully air conditioned using eight General Blower centrifugal, backward blade fans. These units deliver a total of 200,000 CFM. They operate quietly, efficiently, are non-overloading. GB can supply all air requirements for heating, ventilating and air conditioning. Call the GB rep in your area or write direct.

There's a GB blower for every purpose. Backward blade, forward curve centrifugal fans — Util-A-Vent sets — Propeller fans — Fume exhausters — Turbo blowers — Gas boosters — Industrial fans.

Send for free information.

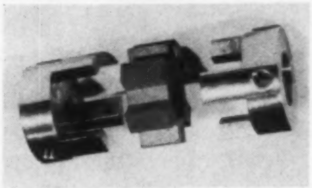
AMERICA BREATHES EASIER
WITH
"Lungs for Industry"

Over 20 years of
engineering and
manufacturing experience

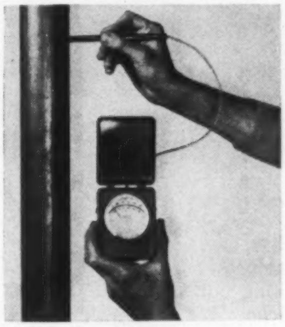
GENERAL BLOWER
COMPANY
8601 FERRIS AVE., MORTON GROVE, ILL.

RECENT TRADE LITERATURE

Continued



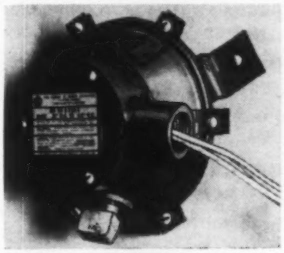
manufacturer says. Cushion body of glass reinforced teflon designed for wear, corrosion resistance. Standard bore sizes 1/4 to 3/4 in. stocked; all other size combinations available.



Thermometer . . .

. . . with new sensing probe — *Royco Instruments, Dept. HPAC,* 722 *Arthur St., Albany* 10, *Calif.*

Probe has sensing element spring loaded between two projecting lips. Arrangement allows sensitive element to be applied with constant pressure, thereby eliminating possible variability of readings obtainable by variable pressures, company says. Scales available in ranges 0 to 300, 0 to 450, 0 to 650, 0 to 1000 F.



Actuating Controls . . .

. . . for sensing pressures or vacuums of 0.05 to 40 in. water gage — *Henry G. Dietz Co., Dept. HPAC,* 12-16 *Astoria Blvd., Long Island City* 2, *N. Y.*

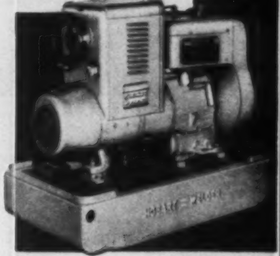
Controls available in three diaphragm sizes. Pressure settings possible by adjusting screws for field

CUT COSTS WITH HOBART WELDERS

Tear Out and MAIL today for more info.

"Yes, tell me about-

☐ **"husky boy"**



200 ampere gas drive, air cooled arc welder. Can also provide 2 KW 70 volts DC electric power when not in use for welding.

☐ **"handy andy"**

100 amp A.C.

This low cost welder is easy to operate on properly wired 110 or 220 v. house wiring. Just plug it in.

☐ **electrodes**

Hobart offers a wide selection of the finest electrodes manufactured today. Get our complete electrode catalog and find out how we can save you money.

Either of these Hobart welders gives you high quality at low, low cost. They're versatile, portable and usable in the wide assortment of jobs you have to do.

HOBART BROTHERS COMPANY, Box HP-18, Troy, Ohio, Phone FE 2-1223
"Manufacturers of the World's Most Complete Line of Arc Welding Equipment."

*My name*____________________
*I'm a*____________________
(title)
*at*____________________
(company)
____
(street address)
____
(city) *(zone)* *(state)*

HOBART TROY OHIO **WELDERS**

"Manufacturers of the World's Most Complete Line of Arc Welding Equipment"

Socony Mobil Bldg., N. Y. C. — Wiremold Air Duct "octopus" in a high-velocity air conditioning system.

CEILING LIMITED?

Wiremold Air Duct leads in and out of tight spots easily

Indiana Nat'l. Bank Bldg., Indianapolis—Wiremold Air Duct runout from branch duct to ceiling diffuser.

Cuyahoga County Bldg., Cleveland—Wiremold Air Duct connects hot and cold risers to underwindow units.

FABRIC
METAL

Exclusive construction—fabric component and supporting steel spiral are mechanically interlocked.

The path from attenuation box to ceiling outlet is often full of obstacles. But Wiremold Air Duct just sweeps around them, making it ideal for air conditioning installations — both low and high velocity.

Made by an exclusive process that mechanically interlocks the fabric with the supporting steel spiral, there is no glue to dry out and cause duct failure. As a result, Wiremold Air Duct provides long life and good performance. Its light weight makes it easy to handle — especially important in cramped quarters.

other advantages

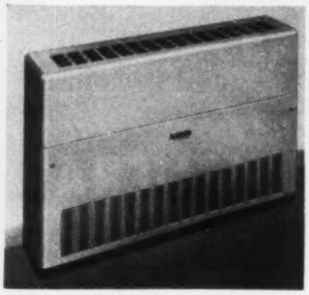
- good air flow with minimum pressure loss
- no air leakage at normal operating pressure
- meets National Board of Fire Underwriters requirements
- compensates for misalignments between connections
- allows for future relocation of units
- acts as a vibration damper
- easy to cut, fit and install

SEND FOR FOLDER NO. 591 for further information on Wiremold Air Duct.

WIREMOLD® FLEXIBLE AIR DUCT

THE WIREMOLD COMPANY, HARTFORD 10, CONNECTICUT

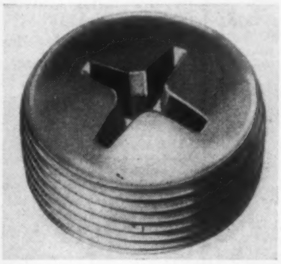
settings. Units suitable for air, gases, liquids, or water when using pressure connections. Vacuum connection usable with air or inert gases. Available with dust tight, splashproof switch housing with sealed connecting leads.



Cabinet Heaters . . .

. . .for offices, lobbies, showrooms, hotels, hospitals—*John J. Nesbitt, Inc., Dept. HPAC, State Rd. and Rhawn St., Philadelphia* 36.

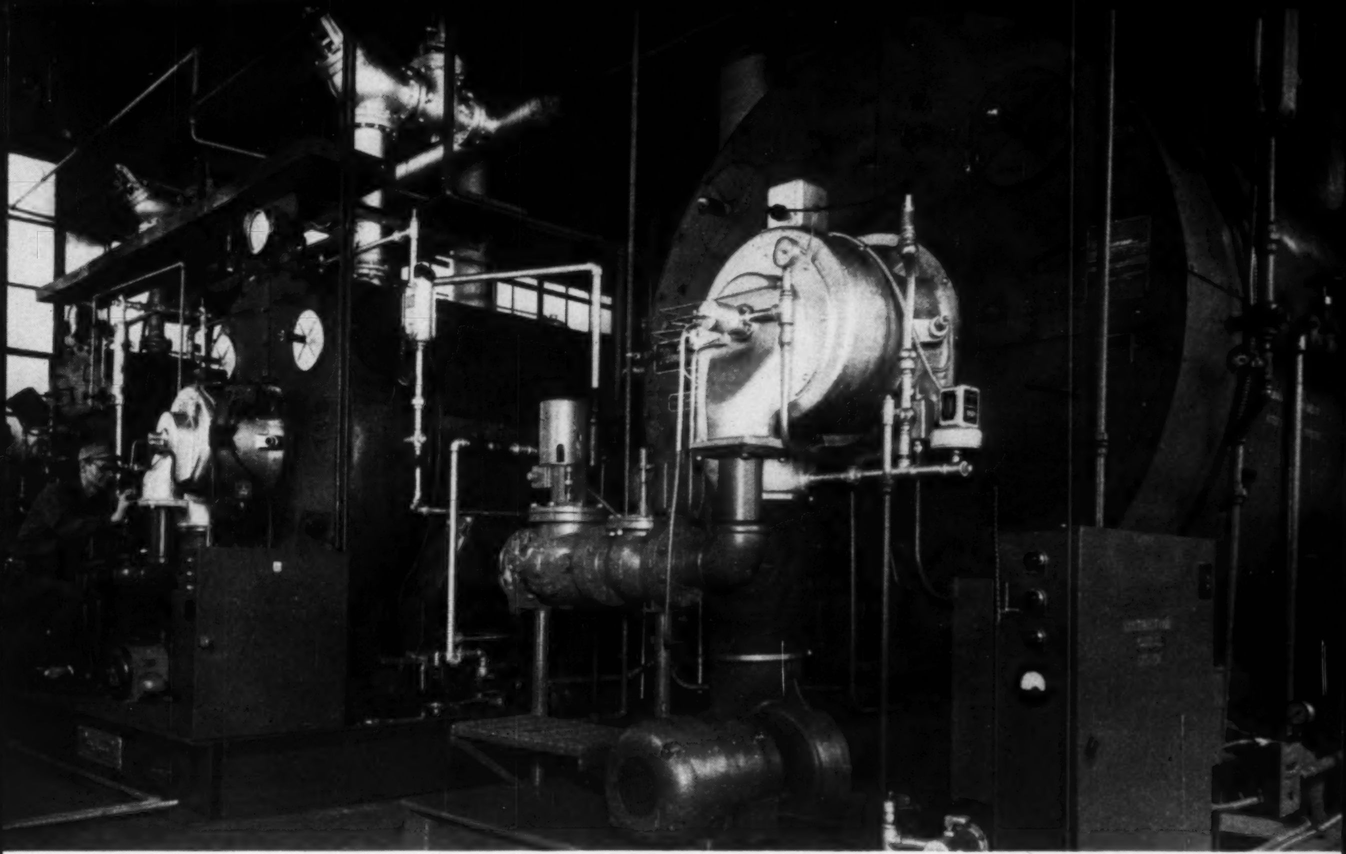
New direct drive, belt drive units available with one- and two-row elements for steam, hot water systems. Three-row element designed for hot water systems. Capacities range 17,300 to 130,500 Btu per hr steam, 9100 to 120,000 Btu per hr hot water. Units may be floor, wall, ceiling, inverted mounted with choice of arrangements either free-standing, fully recessed, semi-recessed, or concealed behind wall.



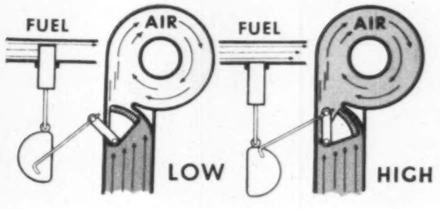
Pipe Plugs . . .

. . .designed to be slip proof—*Pipe Plugs, Inc., Dept. HPAC, Wellington, Ohio.*

Units available in sizes 1/16, ⅛, ¼, ½, ¾, 1 in. in steel, aluminum, brass, stainless steel, everdur. "Dryseal" process applied which eliminates leakers, manufacturer says.



Powermaster® solves plant heating problem ...machinery builder buys *two more!*



Fuel-Saving Combustion Modulation

Powermaster's automatic modulating firing control maintains proper fuel-air ratio at the burners for peak firing efficiency at infinitely variable loads from 20% to 100% of normal firing rate. This instantly responsive modulation saves fuel and assures constant steam pressure and temperature regardless of load variations.

"Heating a plant like ours was like trying to keep steam in a bucket," complained the Maintenance Foreman of the world's leading manufacturer of canning and processing equipment. Old coal-fired boilers "couldn't meet our requirements of maintaining precise and different temperatures in various plant shops where rapid changes in heat demand occur during severe winter weather."

As a result, the company replaced them in 1946 with a 150-hp *Powermaster* Packaged Automatic Boiler. Plant officials were so pleased with its performance that when more steam capacity was needed in 1949, a 200-hp *Powermaster* was added. Continued satisfaction with *Powermaster* led to a third unit, also 200-hp, being installed for heating a new plant addition in 1956.

"Operating 24 hours a day, 7 days a week, our *Powermasters* have never faltered in over 10 years of constant service," says the Plant Superintendent. "We have never had any maintenance problems. Operation is simple and inexpensive . . . effecting major savings in boiler room costs."

What better testimonial to a boiler's all-around dependability and economy. Get the full *Powermaster* story from your nearby representative and write for Bulletin.

Powermaster®

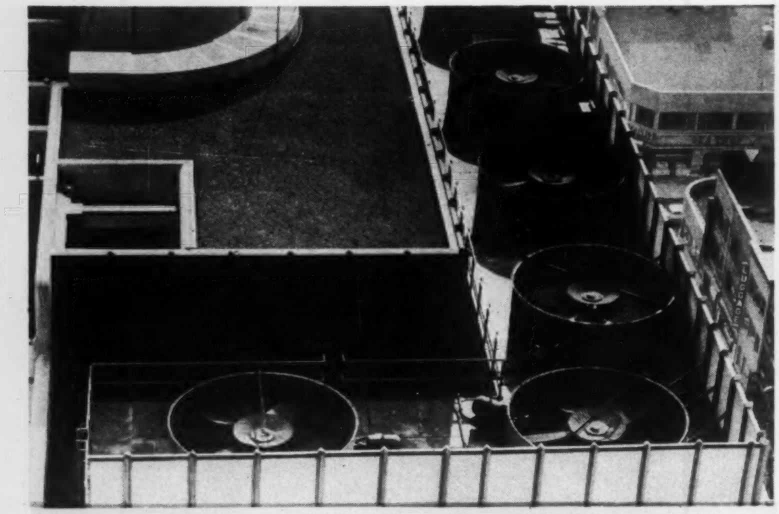
PACKAGED AUTOMATIC BOILERS

Sizes to 500 HP; pressures to 250 psi

ORR & SEMBOWER, INC.

Builders of Dependable Boilers Since 1885

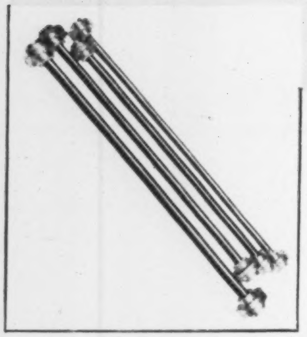
Morgantown Road, Reading, Pa.



Waldron floating shaft couplings used on nine Phillips Cooling Towers

WALDRON

flexible couplings...



USED IN HUNDREDS OF DIFFERENT APPLICATIONS BUT ALWAYS FOR THE

same 3 reasons

1 **STRENGTH** —Hubs and cover sleeves for sizes 1¼A through 7A are machined from tough steel forgings. Hubs are keyed to the shafts. The two one-piece cover sleeves function as a single, rigid unit serving as a floating connecting link between the hubs. High strength of forgings makes possible a very compact coupling with low rotating inertia.

2 **RELIABILITY** —There are no flexible parts to bend or break and the coupling is dust, moisture, and oil tight. Patented Walflex seal is at the lowest possible diameter where centrifugal force is least. Clearance between teeth in hubs and sleeve is engineered so that an oil wedge always separates them, taking the wear.

3 **SERVICE** —Plenty of rough bore couplings, already assembled—on the shelf for *immediate* delivery. Finish bored standard couplings shipped to meet customers' schedules. We are geared up to give you realistic delivery on *any* type of couplings.

Ask for Catalog 57

JOHN **WALDRON** CORP.
NEW BRUNSWICK, NEW JERSEY
Representatives In Principal Cities
Export Agents—Frazar & Co., New York, N. Y.

EQUIPMENT DEVELOPMENTS

Continued

Odor Filters . . .

. . .for commercial air conditioning units—*Connor Engineering Corp., Dept. HPAC, Danbury, Conn.*

Unit has metal frame supporting several densely packed columnar beds of activated carbon held in wire mesh, interspersed by air by-passes. It fits directly behind dust filter. Available in four sizes, 16 × 20 in., 16 × 25 in., 20 × 20 in., 20 × 25 in., with capacities 640 to 1000 cfm. At rated capacities, resistance is 15 in. water gage. When activated carbon filter medium becomes saturated, it may be replaced by fresh carbon, company says.

Relief Valve . . .

. . .for water heaters—*A. W. Cash Valve Mfg. Corp., Dept. HPAC, Box 191, Decatur, Ill.*

Offset fuse plug holder permits fuse plug replacement without disturbing valve's installation, company says. Fuse plug stem—either short or 6 in. extension—removed by unscrewing hex nut on top of valve above inlet. Fuse plug may be placed in hottest part of tank's water, according to manufacturer.

FIRST OF A SERIES OF **DATA SHEETS** REMOVE AND RETAIN

NEW: THE DRAFT CONTROL THAT SERVES ALL FUELS

The Field Triple-Fuel M+MG2

APPLICATION DATA: A triple-fuel draft control, designed for oil, oil-gas, gas, and coal-fired furnaces and boilers with 10″ through 32″ outlets, either natural, induced, or forced draft.

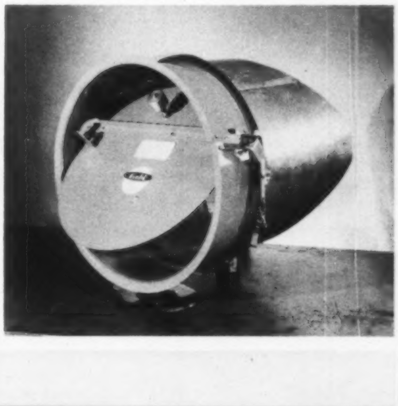
DESIGN DATA. The M+MG2 is a precision-made, three-fuel control. Because it is a control of extreme sensitivity, it is, of necessity, a control of extreme structural strength. For example, accuracy is increased when the clearance between a ring and gate is held to a minimum. To permit this, in the M + MG2, without risk of binding, Field developed a die-formed, heavy gauge ring that is the strongest ever offered on a draft control. Its deflection strength exceeds many fold the normal requirements of shipping, installation or use. The gate is also the heaviest made — 39 pounds for a 32 inch control. Such weight obviously provides extreme rigidity. Heavy weight is also, paradoxically, a requirement of the virtually friction-free mounting that gives the M + MG2 its extreme sensitivity. Only a heavy gate could be so delicately balanced. The same weight factor also prevents the spurious responses to which so sensitive a gate might normally be subject.

The M + MG2 gate is mounted on a long, thin, stainless steel knife edge, which in turn rests on self-aligning bearings. The bearings are self-cleaning. Soot or dirt cannot accumulate to cause binding or friction. They are also self-levelling — assuring that the knife edge is always in contact across the full width of the bearing, for an even distribution of weight. When the gate moves, only the sharp corner of the knife edge rests on the bear-

M +MG2 Barochek for Solid Fuels

A triple-fuel control, the M+MG2 requires only minor, on-the-job changes to handle different fuels. Fuel conversions cannot obsolete this control.

M +MG2 Single-Acting for Oil


M +MG2 Double-Acting for Gas

Remove and file for reference.

Perforated for easy tear-out.

The Field Type **M+MG2**

ings — an area of contact so minute that friction is virtually nonexistent. The result is extreme and instantaneous sensitivity to draft change. The gate is deeply recessed in the ring, to direct the flow of air over the gate and avoid response to random, variable air conditions outside the control.

The M + MG2 permits an unusually wide range of draft settings. The 18″ control, for example will maintain a draft setting as low as .002″. The same control will maintain a draft as high as .35″, a requirement where there is a very high draft loss through the appliance. Compensation for differences between horizontal and vertical installation is fully provided, by the simplest means available on any Field control. Where a safety switch must be specified, to meet gas code requirements, attachment is easily, effectively, and compactly made. Compactness is a characteristic of the M + MG2. There are no protruding parts. Even the stainless steel bead chain is short, holding setting weights neatly against the side of the control.

The M + MG2 is a heavy control, and it is strong to a degree even beyond what its weight implies. For actual weights, sizes and other data, see the table below.

Data Sheet No. 2 will cover Application Engineering.

PHYSICAL DATA

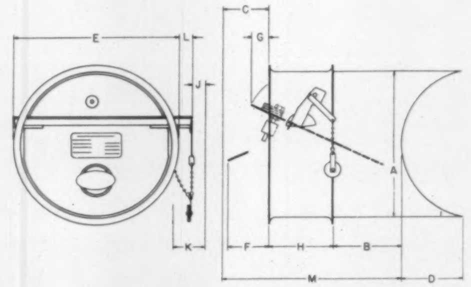
Control Size	Nominal Capacity Sq. In.	Recom. Pipe Sizes		A	B	C	D	E	F	G	H	J	K	L	M	Shpg. Wt.		Vol. (Cu. Ft.)	
		Dia.	Circum.													Comp.	L.C.	Comp.	L.C.
10	78.5	9 & 10	28¼ to 31½	10	4⅜	10	4¼	11	3⅜	1⅛	4¾	1	3½	1	19⅛	9½ #	7½ #	.76	.49
12	113	11 & 12	34½ to 37¾	12	5¾	12	5	13¼	4⅝	1¾	4¾	1	3½	⅞	22½	11½ #	8½ #	1.32	.70
14	154	13 & 14	40¾ to 44	14	7⅛	14	5¾	15½	5⅜	2⅛	5⅛	1	3½	⅝	26¼	17 #	11 #	2.12	1.03
16	201	15 & 16	47 to 50¼	16	8⅜	16	6½	17½	6⅛	2⅜	5⅝	1½	4	⅝	30	28 #	17¾ #	3.1	1.41
18	255	17 & 18	53½ to 56½	18	8¼	18	7½	19½	6⅞	2¾	7⅜	1½	5¼	1⅝	33⅝	34 #	22½ #	3.98	2.09
20	314	19 to 21	59¾ to 66	20	9⅝	20	8⅛	22	7⅝	3	7¾	1½	6¼	1¼	37⅜	42½ #	28¼ #	5.65	2.90
24	452	22 to 25	69 to 78½	24	12⅜	24	10½	26	9¼	3⅝	8⅝	2	6¼	1¼	45¼	65 #	44 #	7.18	4.35
28	616	26 to 30	81¾ to 94¼	28	13⅛	28	*	30½	10¾	4⅛	11⅜	2	6¼	⅞	52½	95 #	69 #	7.80	7.80
32	804	31 to 34	97½ to 107	32	15⅜	32	*	35	12¼	4¾	12⅛	2	6¼	⅝	59½	123 #	89 #	12.20	12.20

*No Points On These Collars

MATERIAL GAUGES

Size	Ring	Gate	Collar
10	20	18	24*
12	20	16	24*
14	20	16	22*
16	18	16	18*
18	18	16	18*
20	18	16	18*
24	18	14	18*
28	16	14	14**
32	16	14	14**

*Galvanized **H.R.P.O. with Enamel Finish



FIELD CONTROL DIVISION

H. D. Conkey & Company, Mendota, Illinois

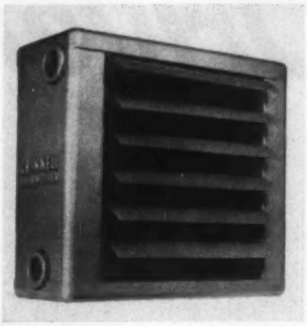
AFFILIATES:
Conco Building Products, Inc. • Brick, Tile, Stone — Conco Materials Handling Div. • Cranes, Hoists

Field

Represented in Canada by Ontor Limited, 12 Leswyn Road Toronto 10, Ont., Canada

EQUIPMENT DEVELOPMENTS

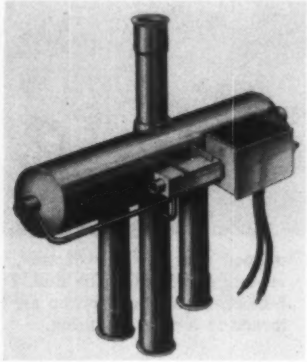
Continued



Unit Heaters . . .

. . .in 26 models with enlarged range of capacities—*Grinnell Co., Inc., Dept. HPAC, 260 W. Exchange St., Providence 1, R. I.*

Equal heating capacity with less weight achieved in new designs with use of brazed tube joints, company says. Two speed motors available in all horizontal, some vertical delivery models. All may be used for steam and hot water, with steam pressures to 200 psi. Electric power requirements 0.035 to ½ hp needed depending upon capacity of particular model.



Reversing Valves . . .

. . .for heat pump control—*Ranco, Inc., Dept. HPAC, 601 W. 5th Ave., Columbus, Ohio.*

Features of new "V25," "V26" units cited include (1) less wear due to dirt, corrosion, (2) nylon transfer slide to reduce friction and act as thermal conductor between hot, cold to minimize heat exchange, pressure. Valves designed to operate under full pressure, provide immediate transfer. Available in five models through 7½ ton capacities.

These 5 big plus advantages prove you're right to choose

Power Line

for your industrial ventilation requirements

1. Complete line: Broadest product line of air-moving equipment for every industrial requirement.

2. Certified performance: All Power Line Fans are rated by PFMA and by NAFM.

3. Backed by 33 years of specialization in manufacture of highest quality ventilation equipment.

4. Competitively priced to give you important cost savings in initial investment and in maintenance. You get the precisely right product to fit your requirements. You don't over-buy with equipment too large or under-buy with equipment too small.

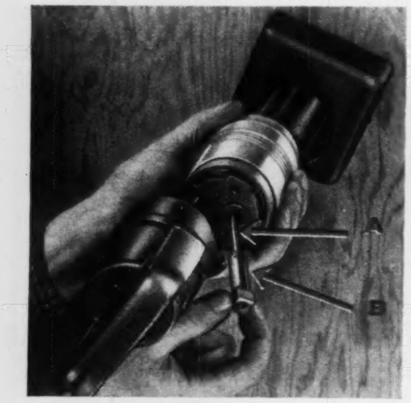
5. Sold only through qualified ventilation specialists. You get expert technical advice and service from the survey of your requirements right through to the completion of your installation.

YOURS ON REQUEST: Big 20-page Power Line Catalog gives complete facts about industrial ventilation, including selection of proper type and size of fan, calculation of duct resistance, and installation procedures, plus features, dimensions, specifications and performance data. Without obligation write for your free copy of Catalog No. 38.

POWER LINE FAN COMPANY, INC.

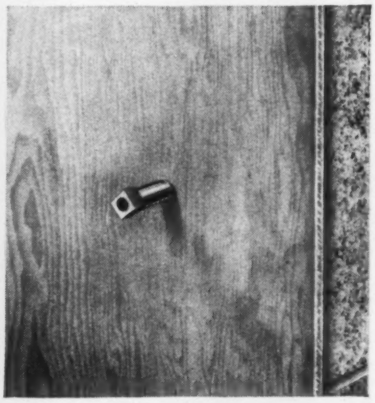
Subsidiary of **Chelsea Products, Incorporated** 639 South Avenue, Plainfield, New Jersey

Safest Stud Driver

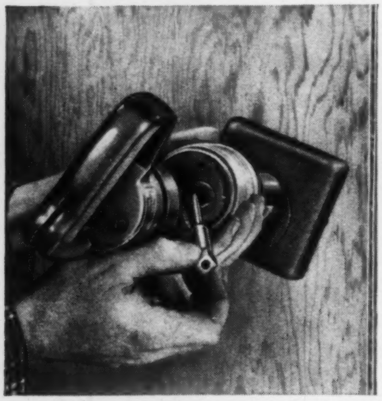


Here's all you do: Simply screw a threaded stud (A) into piston (B), insert in barrel of Stud Driver, insert Power Load, close the tool and . . .

it's ready to fire! Press the Stud Driver guard firmly against work surface and squeeze the tool's trigger. A 45° turn aligns buffer assembly . . .



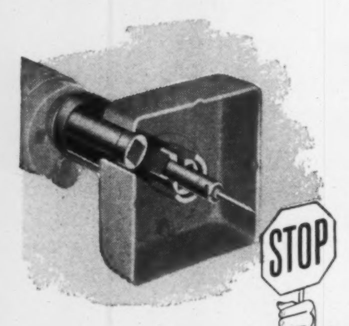
with piston . . . and the Stud Driver is easily removed from work. The stud — with piston still attached — is permanently anchored. Next,



Fastening in improper materials: Piston with stud is inserted into barrel of the Stud Driver, Power Load is inserted, tool is closed. Then . . .

operator inadvertently fires the "Safety-Zoned" Stud Driver into a thin work surface, as shown in the photograph. Piston is . . .

stopped short at end of tool, preventing free flight of the stud. That's because the stud and piston are both locked to tool during firing.



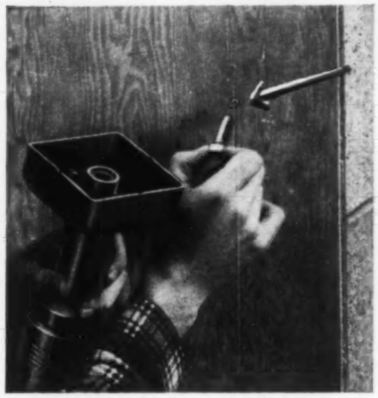
Exclusive Remington *"Safety-Zoned"* Guard Assembly is designed to prevent free flight of studs

New concept in safety is offered by the Remington Model 455A Stud Driver with Captive Stud Guard Assembly. Heart of the exclusive Remington Guard Assembly is a combination of captive piston and aluminum alloy buffer. Square-headed piston is abruptly halted by buffer when base material is inadequate to stop the stud. You can count on the Stud Driver to do your construction fastening jobs quickly, effectively and *safely!*

If you already own a Remington Stud Driver, ask your distributor about the new Captive Stud Guard Assembly. If you're planning to buy a tool, remember: If it's the Remington Captive Stud tool, it's the safest Stud Driver on the market!

On the Square . . . . . . It's the Safest!

Ever Designed!



unscrew piston from threaded stud, screw another ¼" diameter Remington Stud into piston . . . and you're ready for the next shot!

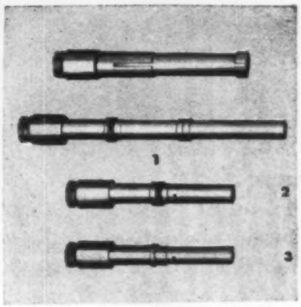
Next step: Piston with stud and deformed aluminum buffer are removed from tool. New buffer is inserted, and tool is ready for use!

Remington Stud Driver with New Captive Stud Guard Assembly

HERE'S the most advanced construction fastening tool ever developed—the Remington Stud Driver with *new* Captive Stud Guard Assembly! The Remington Stud Driver offers you power, speed and efficiency—yet it's designed to prevent free flight of studs through a working surface. That means additional protection in crowded areas, permits use of the Stud Driver in a whole new range of situations.

Just a squeeze of the trigger is all it takes to anchor wood or metal to concrete or steel with ¼" diameter alloy steel Remington Studs. There's a wide selection of studs to choose from, plus scientifically graded Power Loads that furnish the *exact* driving force you need. No outside power connections are required—pre-drilling is entirely eliminated!

Now . . . in addition to barrel for Captive Stud Guard Assembly, 3 interchangeable standard barrels give greater-than-ever versatility



Remington Stud Driver owners have *three* other barrels to choose from in addition to special barrel for Captive Stud Assembly: (1) heavy-duty ⅜" long barrel to handle toughest construction jobs; (2) ⅜" short barrel for medium-duty work; and (3) a ¼" standard barrel for light fastening. *And* there are more than 15 instantly attachable Remington Guards to adapt the Stud Driver for every fastening requirement!

MAIL COUPON TODAY FOR VALUABLE FREE BOOKLETS!

Industrial Sales Division
Remington Arms Company, Inc.
Bridgeport 2, Connecticut

HPA-1

Please send me full information about the new Remington Stud Driver and Captive Stud Guard Assembly.

Name ....

Firm .... *Position* ....

Address ....

City .... *State* ....

Remington
DU PONT
STUD DRIVER

Remington Arms Company, Inc.,
Bridgeport 2, Connecticut

UP IN THE AIR

ABOUT FAN SELECTION?

. . . order Chicago Airfoil Bladed Fans

Aerodynamically shaped blades cut H.P. up to 35% and move more air with 65% less noise. Fans rated 600 to 1 million cfm.

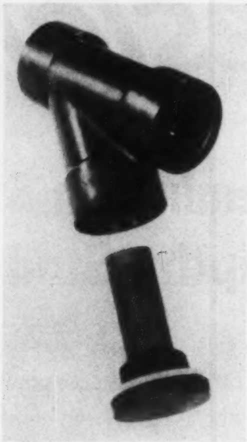
Write for Bulletin A-102M

CHARTER MEMBER of A.M.C.A.

CHICAGO BLOWER CORP.

9863 Pacific Ave., Franklin Park, Ill

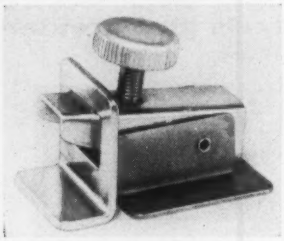
See Phone Directory for Sales Offices



Plastic Strainer . . .

. . .made of polyvinyl chloride — *Walworth Co., Dept. HPAC, 60 E. 42nd St., New York* 17.

Designed for service on alkalis, acids, inorganic salt solutions, other corrosive materials. Available with either threaded, solvent weld socket type of flanged ends, in sizes ½ through 2 in. Service ratings 150 psi at 75 F, 75 psi at 150 F.



Fastener . . .

. . . for airtight, lightproof, vibration resistant applications — *Torit Mfg. Co., Dept. HPAC, Walnut & Exchange Sts., St. Paul 2, Minn.*

Cadmium plated unit consists of sliding, pivoted latch tightened under compression action of thumb screw. Used for doors on industrial dust collectors where seal must be dust-tight, company says.

Solenoid . . .

. . . for intermittent, continuous duty—*Guardian Electric Mfg. Co., Dept. HPAC,* 1621 *W. Walnut St., Chicago* 12.

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Air Washers

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PRODUCTS
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FICTION and FACT

FICTION:

Heavy weight is a requirement for heavy duty panel type air filters.

FACT:

R P Aluminum Industrial Air Filters weigh only 4 pounds (20" x 20" x 2") compared to 12 pounds for a steel filter of equivalent size.

RP

Multi-Velocity Industrial AIR FILTERS

Strength and ruggedness, with light weight, is an important advantage of R P Multi-Velocity Industrial Air Filters. Constructed of aluminum, these permanent-type washable filters are safe and easy to handle, during installation...during cleaning; eliminate the necessity for expensive, heavy structural design in filter bank construction; reduce operating costs through longer service life and faster, easier handling; are non-rusting, corrosion-resistant.

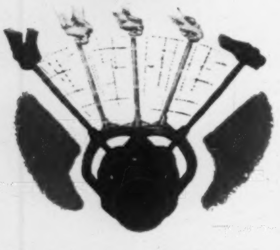
Plus—ODOR REMOVAL—automatic, efficient absorption of odors through the use of R P Super Filter-Coat, the odor and dirt removing adhesive. *Write for complete information.*

RP *Products of Research*

RESEARCH PRODUCTS *Corporation*
Dept. 46, Madison 10, Wisconsin

Cut Steel or Cast Iron Pipe up to 12"
EASIER and FASTER

WITH THE NEW
REED



HINGED 4-WHEEL
PIPE CUTTER

- Closed Frame Construction assures complete rigidity with less weight.
- 4-Wheel design needs minimum swing of handle.
- 4-Point pipe guide aligns cutter for perfect tracking of wheels and a right angle cut.
- Quickly interchangeable wheels for steel or cast iron.
- Needs only 3" space to pass under 12" pipe.

For ditch work or similar close-quarter operations these new Reed Cutters are practically indispensable and fully justify replacing whatever cutting equipment you are now using.

You can, for example, cut 8" steel pipe in less than five minutes, and cast iron pipe even faster.

Available in five sizes for steel or cast iron pipe from 1" to 12".

FOR FAST TURNING IN TIGHT SPOTS—
USE THE IMPROVED REED CHAIN WRENCH

Handles range from 10" to 60" in length.
•
You can tighten up or "back off" without taking wrench from pipe.

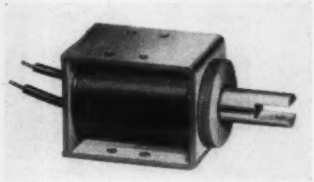
These improved chain wrenches will do anything an ordinary pipe wrench will do . . . and do it easier, better and faster. Ideal for ditches or tight corners.

Grip securely with no play, yet they have a ratchet-like action.

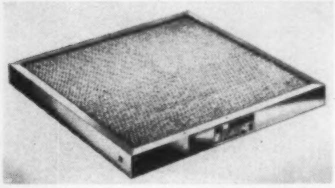
REED

[illegible] guaranteed to be the most efficient tools you have ever used. See your jobber or write for literature.

REED MANUFACTURING COMPANY
ERIE • PENNSYLVANIA



New unit, equipped with ½ in. diameter tapered plunger, said to lift to 9 lb. Plunger stroke adjustable from 1/32 to 3/4 in.; two 3/32 in. steel washers welded to front of field piece to increase power efficiency, company says. Available for 6 to 230 volts, 60 cycle a-c or d-c.



Air Filter . . .

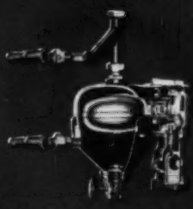
. . .engineered to provide light weight by means of aluminum — *Research Products Corp., Dept. HPAC, Madison 10, Wis.*

Unit provides increase in structural strength, ruggedness and significant reduction in overall filter weight without affecting performance characteristics, manufacturer says. Other features cited: ease of handling, ease of cleaning, nonrust service. Odor removal possible with use of "Super Filter Coat," an adhesive designed to recoat filter, restore efficiency.

Aluminum Insulation . . .

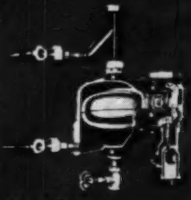
. . .measuring 5¼ in. deep—*Infra Insulation Inc., Dept. HPAC, 525 Broadway, New York City.*

"Infra Insulation Type 9" provides nine parallel, rectangular shaped, reflective spaces with C factor of 0.043 and U factor of 0.04 for upheat flow in winter. For downheat flow in summer, it has C of 0.029 and U of 0.03, company says. Respective insulation values said to be 7¾, 11¼ in. Product made of eight 2-, 3-ply aluminum fiber laminate layers. Air spaces, layers—¾ in. apart—stretch from joist to joist.

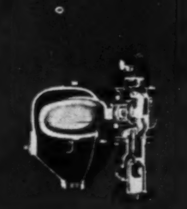


No. 47 Boiler Water Feeder for hand-fired steam boilers up to 5000 sq. ft.

No. 47-2 Feeder Cut-off Combination for automatically-fired steam heating boilers up to 5000 sq. ft.



No. 147 Boiler Water Feeder — Like No. 47 but with higher feeding level for small process boilers.

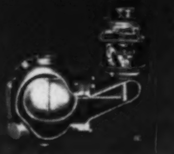


No. 247-2—Feeder Cut-off Combination for small hot water space heating boilers.

No. 51-2 Feeder Cut-off Combination for automatically-fired heating boilers over 5000 sq. ft.

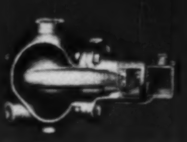
No. 53-2 Feeder Cut-off Combination — Like No. 51-2 but for higher pressures up to 75 lbs.

No. 67 Low Water Fuel Cut-off for low pressure automatically-fired steam boilers.



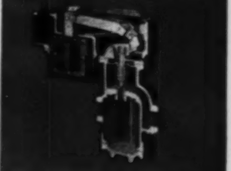
No. 63 Low Water Fuel Cut-off for hot water space heating boilers up to 50 lbs. pressure.

No. 69 "Built-in" Low Water Cut-off. One of many "built-ins" for installation in tapping provided in modern boilers.



No. 61 Low Water Fuel Cut-off for 1" equalizing pipe installation on low pressure steam boilers.

No. 767 Low Water Fuel Cut-off (with No. 14 blow-off) for installation in boiler opening.



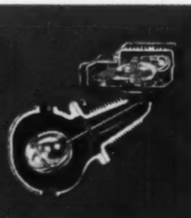
No. 101 Electric Water Feeder — Operated by McDonnell two-switch cut-offs or liquid level switches.

How many of these McDONNELL products do you know?

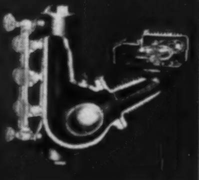
Check them over. You'll find a number of products you know well—but you'll also find many to solve those special problems that come up calling for liquid level controls, flow switches, and related equipment. It will pay you to know these and other products in the McDonnell FULL LINE. Ask for complete information.

McDONNELL & MILLER, *Inc.* 3506 N. Spaulding Ave., Chicago 18, Illinois

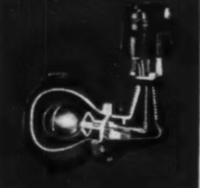
Doing One Thing Well



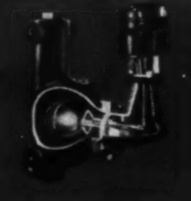
No. 150 Pump Control, Cut-off and Alarm Switch for boilers of any size up to 150 lbs. pressure.



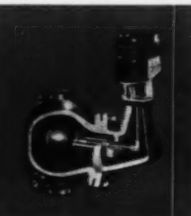
No. 157 Pump Control, Cut-off and Alarm — Like No. 150 but with integral water column.



No. 91 Pump Control, Cut-off and Alarm — New magnetic repulsion switching type for boilers of any size up to 150 lbs. pressure.

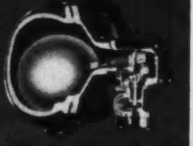


No. 191 Pump Control, Cut-off and Alarm — Like No. 91 but with integral water column.

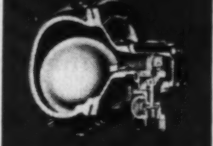


No. 92 Pump Control, Cut-off and Alarm — new magnetic repulsion switching type for pressures up to 250 lbs.

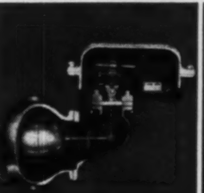
No. 192 Pump Control, Cut-off and Alarm — Like No. 92 but with integral water column.



No. 355 Large Capacity Float Valve—many uses on tanks, stills, receivers, etc.



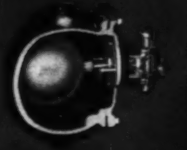
No. 4155 Feed Water Controller for multiple boiler jobs to divert pump discharge into proper boiler.



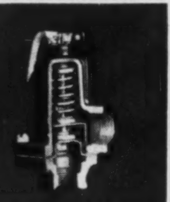
No. 65 Explosion-proof Electric Controller Underwriters' listed for hazardous locations.

No. 80 Float Switch. Three-wire high- or low-level alarm (or pump control) on oil storage tanks.

No. 21 Make-up Water Feeder for maintaining water level in receiving tanks — typical of series with flanges to fit existing tank openings.



No. 27T Make-up Water Feeder for external application on receiving tanks.



230 Series (ASME) Pressure Relief Valves for hot water boilers, tanks and heaters.

240 Series (ASME) Pressure Relief Valves for larger hot water boilers, tanks and heaters.

No. 230 M-2 (ASME) Progressive settings pressure relief valves for large hot water space heating boilers.

No. 201 Temperature Relief Valve for hot water tanks and heaters. A.G.A. tested, rated and listed.

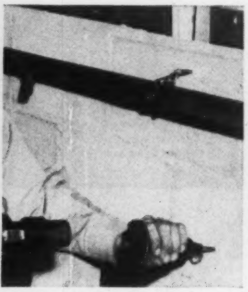
202 Series Automatic Reseating Pressure and Temperature Relief Valves. ASME (NB) A.G.A.

No. E-2 Flow Switch — completes (or breaks) circuit when flow starts or stops.

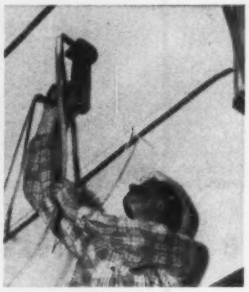
9 out of 10 save by using *Ramset® Products!*

RAMSET® powder-actuated tools and SHURE-SET® hammer-in tools cut fastening time and helped speed completion of this 23-story Cleveland Office building. "Saved from 2 to 15 minutes per fastening, depending on the particular job!", according to general superintendent.

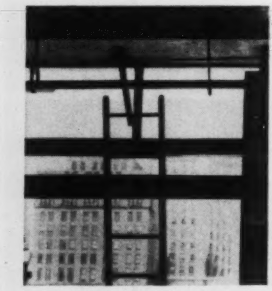
Harrington Electric Co.—electrical contractors—Installed floor conduits, ceiling lights, etc., using both SHURE-SET and RAMSET.



Feldman Bros. Co. — Steamfitters—Used SHURE-SET to anchor radiator chain supports.

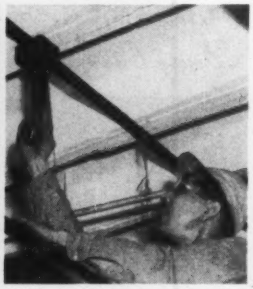


Korner Sheet Metal Co.—sheet metal work—Installed air-conditioning ducts with straps anchored by SHURE-SET.



Builders Structural Steel Corp.—steelwork and valances—Used RAMSET to prevent thru-bolted trusses from swaying.

Johnson Service Co.—temperature controls — Twin temperature pipes anchored with SHURE-SET.



Gillen Acoustical Co.—acoustical ceilings—Kickers and hangers installed with RAMSET.

Home & Industrial Heating Co. — air-conditioning — Used RAMSET fasteners to hang heavy external louvers.

E. J. Brandt Co., Inc.—perimeter guards—Installed kicker plates and radiator guards with RAMSET.

TOOL SUP.CO.PR
Rams

Geo. A. Fuller Co. — general contractors — Door bucks anchored with SHURE-SET threaded studs and extension couplings.

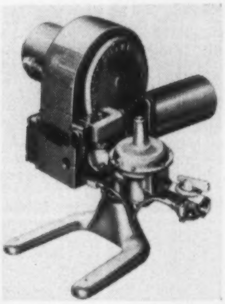
Shure-Set
Trademark
HAMMER-IN FASTENING TOOLS
PATENTS PENDING
BY THE MAKERS OF *Ramset®* PRODUCTS

Ramset Fastening System
WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

12109-D BEREA ROAD CLEVELAND 11, OHIO

EQUIPMENT DEVELOPMENTS

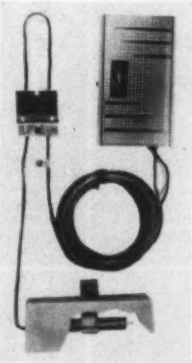
Continued



Gas Burner . . .

. . .incorporating air power switch coupled with purge valve — *Auburn Burner Co., Dept. HPAC, Edgerton, Ohio.*

Unit has "Cushioned Power" solenoid valve with built in pilot connection which simplifies installation, servicing of both valve and pilot, company says. Heating capacities 100,000 to 650,000 Btu per hr. Two features cited by manufacturer are quietness of operation and adaptability to all types of furnaces and boilers.



Reset Thermostat . . .

. . .combining outdoor and room temperatures—*Automatic Devices Co., Inc., Dept. HPAC, 714 Hillgrove Ave., Western Springs, Ill.*

"3W Weather-Flo" provides continuous, gentle flow of heat—modulated in temperature with each degree change in outdoor temperature, further modified by slightest change in indoor temperature, company says. Unit designed to work with all types of hot water, warm air heating systems.

THE SECRET...

The secret of Ilg Type BC Centrifugal Fans is backward-curved airfoil blades . . . blades that move more air with less noise. Air flows smoothly over these streamlined surfaces—eliminates shock loss. Higher efficiency results—allows you to specify a smaller, more compact Type BC unit. Heavy-duty, all-aluminum construction that meets NAFM Class I, II, and III duty requirements up to 9″ static pressure without change or modification is standard on all models.

AMCA seal certifies that ratings are in accord with approved codes. Direct connected drive with Ilg motors provides many money-saving advantages. Belted fans also available.

ILG

The Man from Ilg can help you plan for efficient ventilation at lowest final cost. Talk your ventilation problems over with him.

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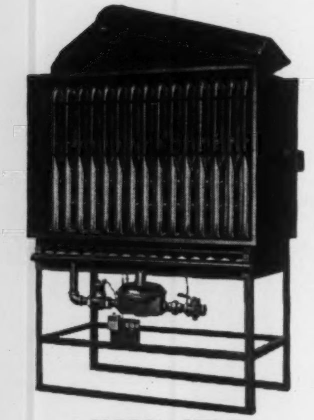
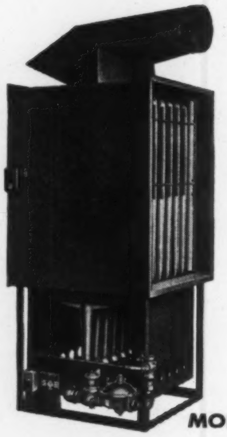
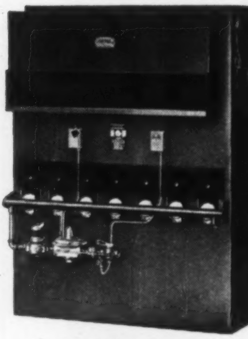
Fully describes advantages and exclusive design features. 32 pages of engineering data and ordering information. Ask for Catalog 257.



MODEL SED-E



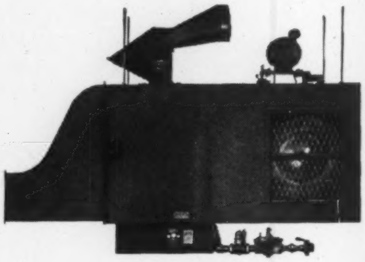
MODEL SED-S



MODEL SED-VF

MODEL SED-E — Non-corrosive type 321 stainless steel heat exchanger. Permits installation downstream of cooling equipment, for continuous blower operation. Air throughput in either direction. 80,000 to 600,000 Btu input.

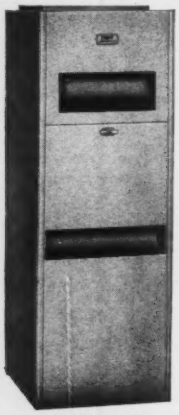
MODEL SED-S — Same as SED-E except controls are at the side, instead of at the end where accessibility requires. Either SED-E or SED-S is available in sizes from 80,000 to 600,000 Btu input in increments of 40,000 Btu.



MODEL SEU

MODEL SED-VF — Tested and approved as a duct furnace; type 321 stainless steel. Re-circulated or fresh air enters through bottom, sides, or back. Built-in air bypass, vent in front. Sizes from 70,000 to 245,000 Btu input.

MODEL SEU — Suspended unit heater. Recirculates room air. Diffuser outlet with adjustable vertical and horizontal vanes. Double inlet forward curve blower. Continuous duty, variable pitch drives, raised port burners. 80,000 to 600,000 Btu input.



MODEL SEC

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outstanding for
commercial, industrial,
schools, churches,
theaters, large residential

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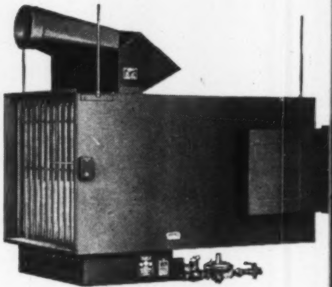


MODEL SES

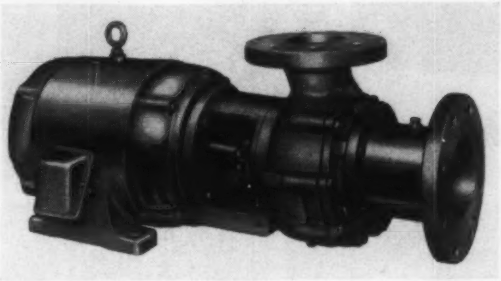
MODEL SEC — Forced air furnace. Stainless steel heat exchanger sections seam and arc welded. One piece cast iron burners with drilled ports. Oversize double inlet blower, glass or washable filters. 6 sizes — 70,000 to 245,000 Btu input. For zero clearance.

REPRESENTATIVES

M. Blazer & Son, Passaic, New Jersey.
Blue Flame Supply Company, Atlanta, Georgia
Sinclair Heating Supplies, Ltd., Edmonton, Alberta, Canada.

Boyd Engineering Co., El Paso, Texas.
Reube O. Emery, Nashville, Tennessee.
F & D Distributors, Salt Lake City, Utah.
Leudecke Engineering Co., Austin, Texas.
McCombs Supply Co., Denver, Colorado.
O'Connor-Oklahoma Co., Oklahoma City, Tulsa, Oklahoma & Wichita, Kas.
Smith Steam Specialty Co., Kansas City, Mo.
Tay-Holbrook, Inc., San Francisco, California.
Dealers Supply Company, Atlanta, Georgia.
J. C. Lewis Company, Little Rock, Arkansas.
Nunn Electric Co., Lubbock, Texas.
Noland & Co., Newport News, Va.
Temp-Control Corp., Portland, Oregon

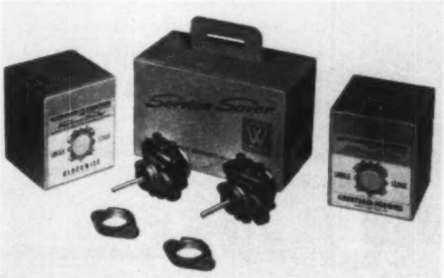
MODEL SES—Forced air, suspended furnace for installation in suspended duct system. Inlet and outlet designed for sheet metal duct connection. Double inlet forward curved blower. Continuous duty variable pitch drives, raised port burners.



End Suction Pumps . . .

. . . for circulating, coolant, cooling tower, condensate return, booster, hot water, tank mounted applications —*Aurora Pump Div., New York Air Brake Co., Dept. HPAC, 80 Loucks St., Aurora, Ill.*

Type "BC" units available in close coupled horizontal, flange mounted vertical, base mounted vertical, pedestal mounted horizontal styles. Sizes range ¼ to 40 hp at 3500 rpm; ¼ to 20 hp at 1750 rpm. Pumps may be changed from packing to seals by interchangeable inserts. Units have steep sloping characteristics with constantly rising head to shutoff; low impeller velocities for smooth operation; wide gasket seals, company says.



Fuel Unit Packages . . .

. . . for replacement use — *Webster Electric Co., Dept. HPAC, Racine, Wis.*

Fuel units on high pressure oil burners can be replaced quickly with two packages, company says. Two single stage "Service Savers"—one clockwise rotation, another counter-clockwise, each with universal mounting bracket—packaged in carryout carton. Two two-stage units packaged in same manner.

Electrode . . .

. . . designed to deposit metal at rate of 17 lb per hr—*Air Reduction Sales Co., Div. of Air Reduction Co., Inc., Dept. HPAC, 150 E. 42nd St., New York 17.*

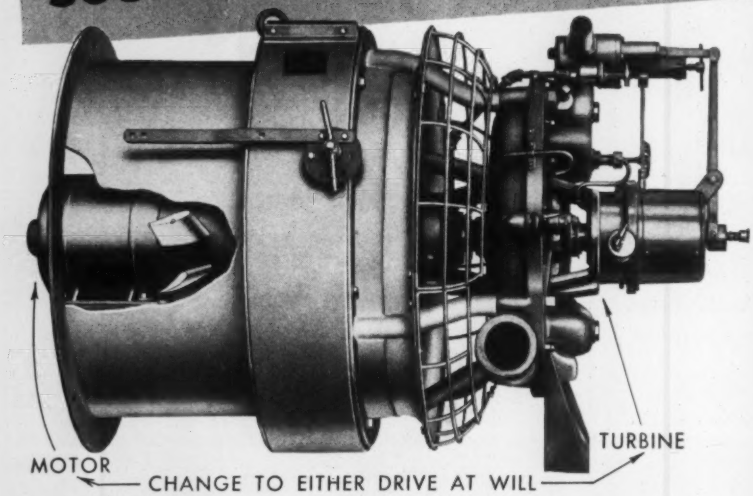
Fast rate of deposition accomplished through use of extra heavy iron powder coating together with increased machine settings, manufacturer says. Unit engineered for making position fillet, lap welds. Single pass ½ in. fillets, flat groove joints may be produced.

This New
RIDGID
4P-J
is the only 2½" to 4" geared threader that's Jam-Proof

It's safe—can't jam and knock equipment around when you thread pipe by power drive. Automatically kicks out after standard thread is cut. Workholder sets to size *before* putting on pipe—other easier work features. See it at your Supply House!

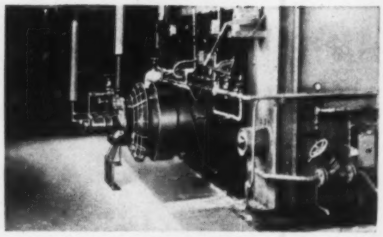
The Ridge Tool Company
Elyria, Ohio, U.S.A.

THE MOST FLEXIBLE SOURCE OF FORCED DRAFT



Wing DUAL DRIVE FORCED DRAFT BLOWERS

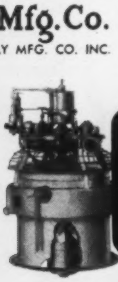
Practically two blowers in one. When Turbine Drive is used, its oil-free exhaust can supply process or space heating steam. During electrical emergencies turbine drive insures continued operation. Motor drive may be used for starting-up and when process or heating steam demand is low. Precise draft control, manually or automatically. Completely assembled, ready to install.



Wing Dual Drive Forced Draft Blower at Easton, Pa. plant of the Dixie Cup Co.

Write for a copy of Bulletin FD-5

L. J. Wing Mfg. Co. 140 Vreeland Mills Road · Linden · N. J.
DIVISION OF AERO SUPPLY MFG. CO. INC.



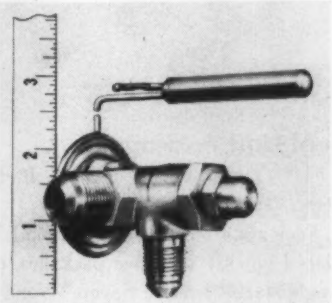
Wing
DUAL DRIVE
BLOWERS

FANS • UNIT HEATERS • DRAFT INDUCERS • BLOWERS • TURBINES

Fluxing System . . .

. . . with interchangeable metering valve assembly—*All-State Welding Alloys Co., Inc., Dept. HPAC, 249-55 Ferris Ave., White Plains, N. Y.*

System designed for use in production, maintenance brazing operations employing oxy acetylene blowpipe. It consists of automatic unit which—installed in acetylene line—proportions "Jet Flux" brazing liquid to flow of fuel gas. It mixes them, causing flame to have greenish tint. Metering assembly precision made for complete interchangeability of parts, company says.



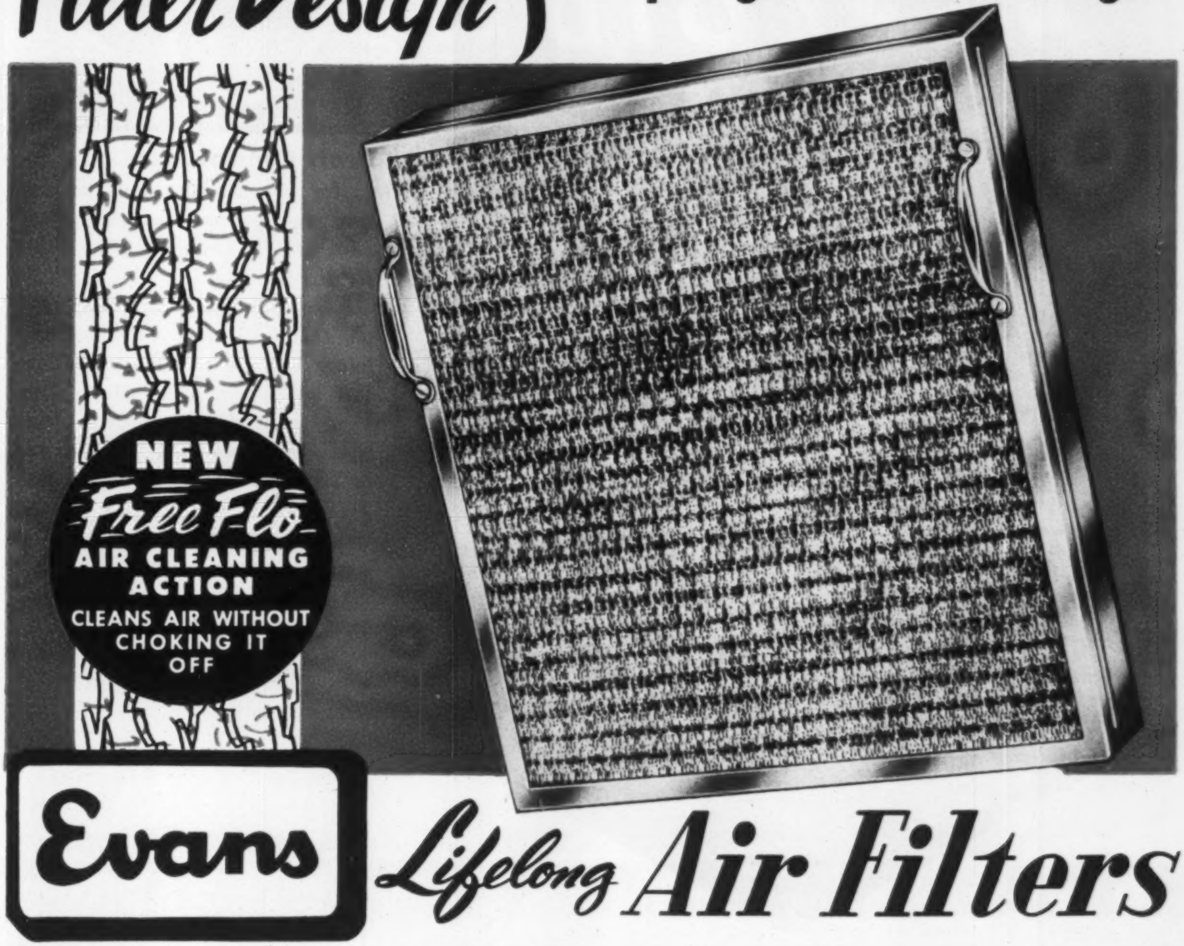
Expansion Valve . . .

. . . in 2 3/16 in. minimum height size—*Detroit Controls Div., American-Standard, Dept. HPAC, 5900 Trumbull Ave., Detroit 8.*

Small size of unit, which has capacity of 1/2 to 5 tons, permits broader usage, manufacturer says. Valve designed to be easily disassembled allowing for inspection, cleaning in field. Power element is removable. Available with external equalizer connection.

NEW *Filter Design*

29% SLOWER RESISTANCE RISE ...per gram of dirt caught


NEW
Free-Flo
AIR CLEANING ACTION
CLEANS AIR WITHOUT CHOKING IT OFF

Evans *Lifelong* *Air Filters*

Super cleans the air . . . yet maintains FULL FLOW AIR DELIVERY

As filter loads, rate of static pressure rise is low and slow. Low resistance permits faster release of cooled air from cooling coils. Thus blower delivers at peak efficiency all during cooling cycle. No sudden jump . . . no sharp vertical rise in resistance. Air delivery system remains in balance. Resistance rise is slow even from 0.50" water gauge to 1.00" or 1.50" water gauge. High lint (or fibrous material) content in the air does not change this performance.

BIG CAPACITY DESIGN

Enables Evans filter to catch and hold lint without choking off air stream (particularly desirable in super markets, department stores, hospital, textile plants, and so forth where there is high lint content in the air).

EXTRA HEAVY LIFETIME CONSTRUCTION

All aluminum (heavy gauge). Every part precision made—precision assembled.

SAVE 50% ON CLEAN AIR MAINTENANCE COSTS

One set of Evans filters last the life of the air handling system. No messy high-tension adhesive oil. Evans fluid has *built-in* detergent to help clean filters. Hose out with ordinary tap water. Light-weight, extra easy to handle.

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THE GEORGE EVANS CORP. • Moline, Illinois

Gentlemen: Rush me full details on the NEW HIGH CAPACITY EVANS FILTER that has a 29% slower static pressure rise per gram of dirt caught.

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COMPANY ____________________

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Over 35 years of
service to the Power Field
MERCOID®
CONTROLS
Weather-Proof
Explosion-Proof
General Purpose

Built to last the life of the equipment it serves

ALL MERCOID CONTROLS
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Write for catalog No. 857 describing Mercoid Controls for pressure—temperature—liquid level—mechanical movement—also relays, mercury switches

THE MERCOID CORPORATION
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EQUIPMENT DEVELOPMENTS

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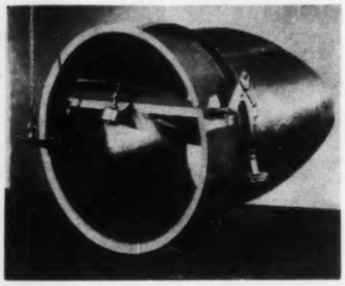


Draft Control . . .

. . . for commercial, industrial furnace and boilers — *Field Control Div., H. D. Conkey & Co., Dept. HPAC, Mendota, Ill.*

New "M-MG2" serves gas, oil, gas-oil, coal installations; requires only minor changes to adjust from one fuel to another, manufacturer says. Unit, operated with one basic control, may be connected to natural and induced draft boilers having flue outlets 10 to 32 in. Among engineering features cited: heavy gage ring designed to provide accurate functioning; sturdy gate for rigidity; compact construction. Draft settings 0.002 to 3 in. water gage possible with 18 in. control, according to company.

Welded Pressure Tubing .

. . . inspected by new system while being manufactured—*Babcock & Wilcox Co., Tubular Products Div., Dept. HPAC, Beaver Falls, Pa.*

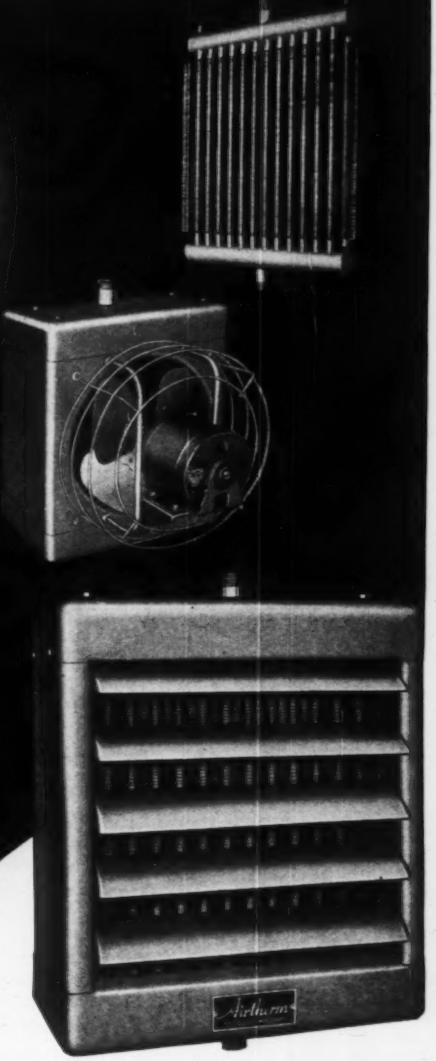
Improved product results from immersed ultrasonic inspection, company says. High frequency sound beamed into metal echoed back by any defect in material. Defect shows up as "pip" on oscilloscope. Operators locate defect precisely by referring to point at which sound entered metal, according to manufacturer. Water used as coupling medium. System used as additional inspection tool to check weld at production speeds.

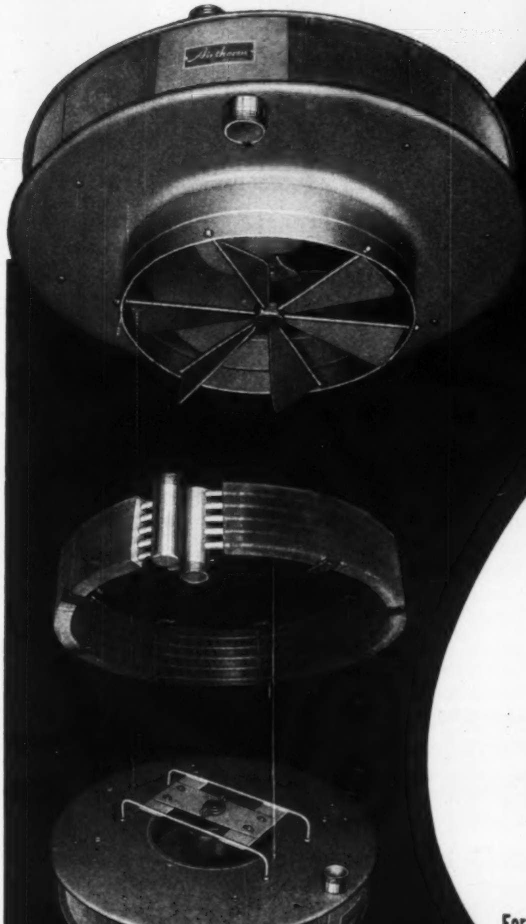
Nameplates . . .

. . . custom imprinted with wording supplied by customers—*Henry G. Dietz Co., Dept. HPAC, 12-16 Astoria Blvd., Long Island City 2, N. Y.*

NEW IMPROVED
Airtherm
PROPELLER FAN
UNIT HEATERS
FOR STEAM OR HOT WATER

A SIZE FOR EVERY REQUIREMENT





The new Airtherm line incorporates 22 completely redesigned vertical units and 24 improved horizontal units, ranging from 18,000 to 555,000 BTU per hour, with a choice of outlet diffusers to cover practically every air distribution pattern and mounting height. Silent operation is assured by resiliently mounted motors, properly designed fans and casings, and attention to face and outlet velocities. All fans are expertly positioned, balanced and tested. Each unit is tested and rated for performance in strict accordance with the Standard Test Code of the industry. Only brand name, continuous duty motors, especially made for the purpose, are used and mountings are designed for efficient cooling and easy servicing. Rugged coils are formed by hydraulically expanding copper tubing into plate type aluminum fins, each with its own collar, providing increased heat transfer and wide, even spacing to reduce clogging. All coils are tested and tagged for 500 p.s.i. hydrostatic pressure. Casings are phosphatized to insure a long, rust-free life for the attractive baked enamel hammer tone finish.

For Complete Specifications Including a Guide for Selection and Application, Write:

AIRTHERM MANUFACTURING CO.
702 S. SPRING AVE. • ST. LOUIS 10, MO.

SUPERGAUGES
INDUSTRIAL GAUGES
BOILER GAUGES
THERMOMETERS
RECORDERS

USG®

Over 50,000 different gauges

to meet
every
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Gauge for gauge—in every application classification—in every price range—you can't beat USG for value. USG has a line to meet every price and performance requirement.

SUPERGAUGE® LINE—With proper application, USG Supergauges will last a lifetime. USG Supergauges are world famous in process control for their *ruggedness, dependability* and enduring *accuracy.*

INDUSTRIAL CAST CASE LINE—For those applications where heavy duty service requirements do not demand the high accuracy of Supergauge construction.

DRAWN STEEL CASE LINE—The outstanding value in the low cost general purpose and domestic heating gauge field.

USG gauges are installed on 6 out of 10 original pieces of equipment . . . the selection by so many buyers who demand both quality and economy being proof of USG values.

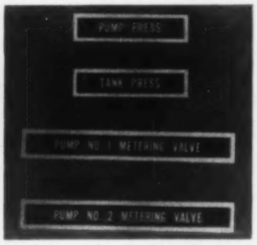
For help with your gauge problems, call the nearest USG Distributor . . . his name is in the yellow pages of your phone book . . . or write the factory.

Find Your Nearest Distributor In The 'Yellow Pages'

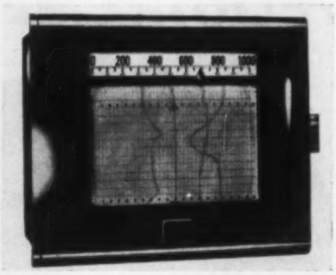
UNITED STATES GAUGE
USG
Home of the SUPERGAUGE

Division of American Machine and Metals, Inc.
Sellersville, Pa.

MORE THAN 50,000 TYPES OF GAUGES • SUPERGAUGES • SOLID FRONT GAUGES • RECEIVER GAUGES • TEST GAUGES • RECORDERS • CONTROLLERS • TRANSMITTERS • PSYCHROMETERS • AVIATION INSTRUMENTS



Nameplates imprinted on 0.020 in. thick aluminum by company's photo chemical process. May be adhered to surfaces with special adhesive. Aluminum letters with black background similar to etched plates, manufacturer says.



Telemeter Receiver . . .

. . . designed to print 16 separate records from telemetering transmission centers — *Bristol Co., Dept. HPAC, Waterbury* 20, *Conn.*

Using multiple switching arrangement, new receiver can monitor large number of values from any distance necessary; variables can be combination of pressure, flow, temperature, liquid level, company says. Unit prints on 12¼ in. wide strip chart; available with either 5 or 15 sec time impulse telemetering system.

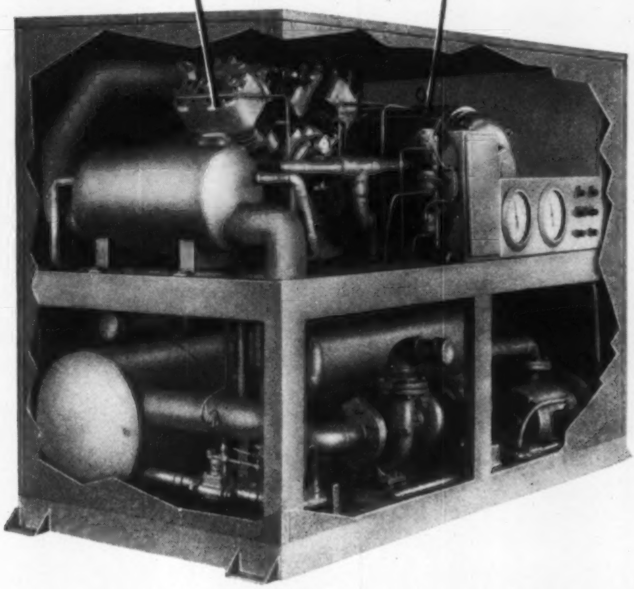
Double Foil Batt . . .

. . . designed for easy handling—*Barrett Div., Allied Chemical & Dye Corp., Dept. HPAC,* 40 *Rector St., New York* 6.

"Reflecto-Batt" has foil on vapor barrier, breather surfaces; plain paper on sides. Foil surfaces diminish conductance of heat into framing of building, company says. Unit has primary springy release action that permits it to come back to specified thickness after being compressed. Available in 15, 23 in. widths.

B&G COMPRESSOR AND ELECTRIC COMPRESSOR MOTOR

Designed and built by B&G! Better performing, longer lasting—built of the finest materials to most rigid specifications. *B&G quality in every detail!*



B & G PACKAGE LIQUID COOLER

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EQUIPPED WITH B & G PRODUCTS *THROUGHOUT!*

THE ONLY UNIT OF ITS KIND WITH ALL MAJOR COMPONENTS DESIGNED, BUILT AND GUARANTEED BY ONE MANUFACTURER:

Compressor • Compressor Motor • Chiller (ASME) • Molded Styrene Chiller Insulation • Condenser (ASME) • Heat Exchanger • Control Boxes • Control Panels • Chiller Pump • Chiller Pump Motor • Condenser Pump • Condenser Pump Motor • Water Relief Valve • Frame • Jacket

EVERYTHING INCLUDED...
NO EXTRAS TO BUY!

WHY THE B&G PACKAGE LIQUID COOLER CAN BE INSTALLED AT SMALLER COST

1. Equipped with quiet, vibration-free B&G Compressor and Electric Compressor Motor—built for years of lasting service.
2. Equipped with B&G Electric Motors throughout.
3. Factory tested under certified conditions and varying loads.
4. Completely wired with interlocked controls. (A truly "plug-in" appliance.)
5. Completely enclosed in good looking, rugged steel frame.
6. New, compact design B&G Evaporator—improved type heat transfer surface. Built to ASME Code, and so inspected and stamped.
7. B&G Condenser has more generous fouling factor—takes less space. Built to ASME Code, inspected and stamped.
8. Equipped with long-life, *quiet* B&G Pumps—all substantially mounted and piped.
9. Easily serviced—every part accessible and replaceable.
10. Hammerloid finish jacket. Undercoated for sound-deadening.
11. Thoroughly cleaned, dried and fully charged with Freon.
12. Tubing brazed in inert gas atmosphere. Inside scale and dirt formation possibility eliminated.
13. Bends instead of fittings, reduce possibility of Freon leakage to a minimum.
14. Easier handling because of low center of gravity.
15. Non-recycling pump-down eliminates continuous pump-down system. Power saved through this feature.
16. 34° without freeze-up. Special B&G Chiller and anti-freeze Control System permits applications down to this low point.
17. Evaporator heater, as well as crank-case heater, eliminates slugging of the compressor.
18. Increment starters eliminate the necessity of resistor or auto-transformer starters.
19. Capacity control system assures greatest efficiency by balancing horsepower to load.
20. Sight glasses and test cocks permit easy and accurate checking of Freon charge.

Send for complete file of specifications and application data.

BELL & GOSSETT COMPANY
Dept. RFC-5, Morton Grove, Illinois
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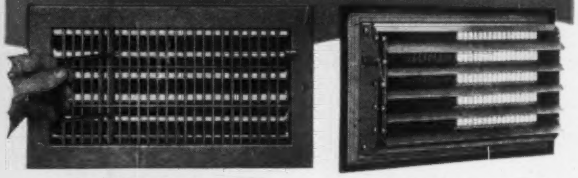
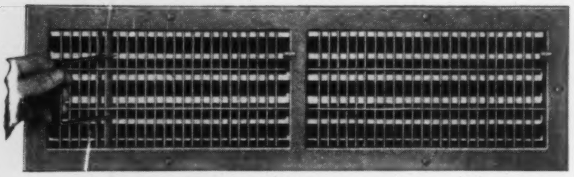
DIRECTED AIR FLOW
at any angle with

INDEPENDENT
"Fabrikated"
REG. U. S. PAT. OFFICE
AIR CONDITIONING
REGISTERS


321-A HMV
Rear View Showing "HMV" Valves

Every grille bar adjustable individually—before or after installation


321-A HMV Tandem

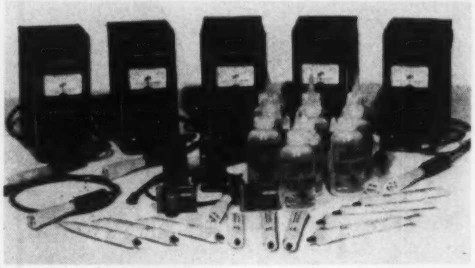
Any direction of air flow—right, left, up, down and any combination—is easily obtained with "Fabrikated" Style No. 321-A HMV air conditioning registers, for residence or commercial installations, on sidewalls or ceiling. The face bars are adjustable to right or left; valves on the back are adjustable to direct the air flow up or down; valves may also be fully closed, and are connected to open or close in unison.

The angles of deflection and the combinations to be had are practically unlimited. Adjustments for directed air flow may be made before or after installation. Grille bars are held firmly in place and will not vibrate or rattle.

"Fabrikated" registers are available in sizes from 8 x 4" to 48 x 24", including tandem style. Special sizes can be made without special die set-up charges.

Write for Catalog No. 56.

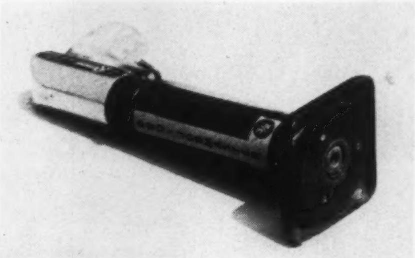
THE INDEPENDENT
REGISTER CO.
3747 E. 93rd STREET · CLEVELAND, OHIO



pH Kit . . .

. . . for multistation use—*Analytical Measurements, Inc., Dept. HPAC,* 585 *Main St., Chatham, N. J.*

New kit includes five portable instruments with carrying cases and buffer solutions, two buffer kits, two extra probes, two sets of batteries. Interdepartment trips may be saved since each department can have its own meter for instant checking, manufacturer says.



Reducer Guard . . .

. . . designed to make possible efficient fastening into concrete with powder actuated tools — *Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., Dept. HPAC,* 12117 *Berea Rd., Cleveland* 11.

Unit may be used on either "Duo-Jobmaster" or "Super-Power" tool. It is 4 in. sq, weighs 2 lb. Surface around fastening remains relatively unmarred; extra penetration into cement achieved because unit compresses area around point of penetration, manufacturer says.

Room Air Conditioners . . .

. . . with engineering, design changes—*Mitchell Mfg. Co., Div. Cory Corp., Dept. HPAC,* 3200 *W. Peterson, Chicago.*

Featured in company's 1958 product line are "True Portable," "Slim 'n Low," "Jubilee" models. New engineering developments cited include "Floating Air Chamber," "Variable Aire" system, washable "Microstatic" filter. "PO5 H-1" portable weighs 62 lb, measures 16⅞ in. wide, 11⅞ in. high, 15 in. deep. Unit rated to cool to 1200 cu ft, may be applied in multiple installations.

BALDWIN-HILL CO., 1701 Breunig Ave., Trenton 2, N. J.

Please send me your bulletin on
Baldwin-Hill Duct Insulation

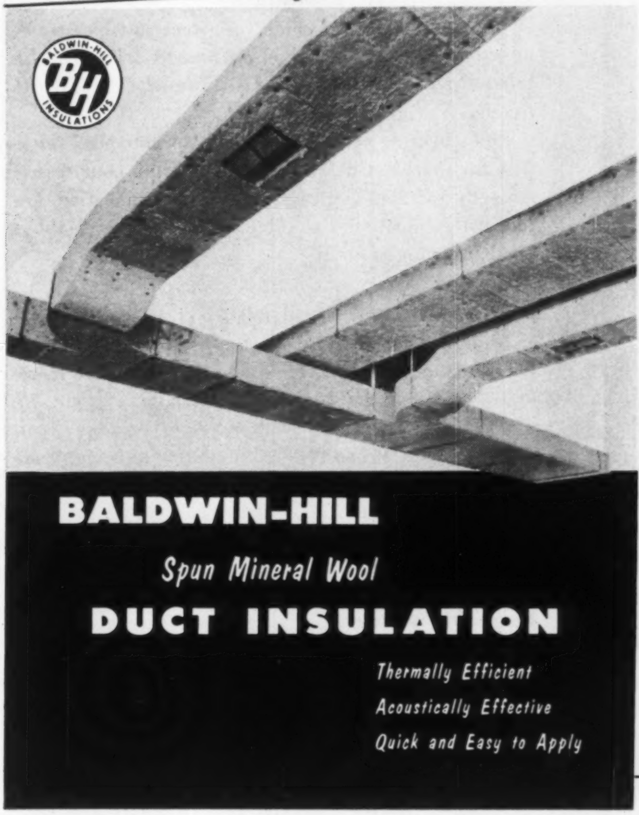
Name________________ Title________

Company________________________

Address*________________________

City________________ State________
* or attach to your letterhead

NEW HELP
for Engineers and
Contractors



BALDWIN-HILL

Spun Mineral Wool

DUCT INSULATION

Thermally Efficient
Acoustically Effective
Quick and Easy to Apply

in

Specifying
a dependable thermal insulation

Buying
at a competitive price

Installing
easier, faster, more economically

In a detailed bulletin, Baldwin-Hill concisely tells the full story of B-H Spun Mineral Wool Duct Insulation. This is a highly efficient material with low thermal conductivity and sound absorption qualities which is furnished plain, coated or with factory-applied vapor barrier.

The bulletin provides information on moisture resistance, density, corrosion resistance, temperature limits, workability, standard application methods, and packaging that will prove extremely helpful to engineers and contractors who specify, purchase or install duct insulation.

The coupon above will bring you your copy of this new bulletin by return mail. For the complete line of B-H Insulations, see Sweet's Plant Engineering File.

BALDWIN-HILL COMPANY

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Kalamazoo, Mich. . . . Huntington, Ind. . . . Temple, Tex.

ACCEPTED

Allen

ROOF VENTILATION

Whatever your ventilating needs, be sure to see how Allen equipment can meet your requirements efficiently and economically.

NEW "I-LINE" for EYE APPEAL

The new "I-Line" provides an attractive low contour, assuring maximum capacity or efficiency with the minimum over-all height.

POWERFUL "VD" for HIGH VELOCITY

By moving a large volume of air at high velocity, this Vertical Discharge fan keeps fumes from sifting back into building.

Allen

. . . is prepared to investigate ventilating problems and plan systems for the efficient removal of heat, fumes, vapor or dust.

WIND-DRIVEN TURBINES

Three types of Allen turbines take full advantage of the economy of natural air movement.

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Remote drive Staxauster is designed to handle corrosive fumes, and/or high temperature air.

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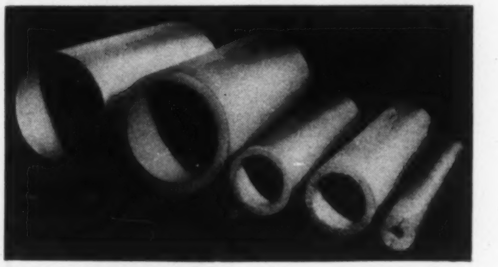

Low Temperature Insulation . . .

. . .designed to provide high resistance to vapor transmission, moisture absorption—*Mundet Cork Corp., Insulation Div., Dept. HPAC,* 7101 *Tonnelle Ave., North Bergen, N. J.*

Pipe covering custom molded to specific size, thickness for precision fit, company says. High compressive strength, extreme light weight, ease of application, low thermal conductivity, durable service among features cited by manufacturer.

Plastic Coated Packing . . .

. . .designed to adapt valves for use over 450 F temperature range without readjustment — *Powers Regulator Co., Dept. HPAC,* 3434 *Oakton St., Skokie, Ill.*

Packing reduces valve maintenance, leakage wherever temperature and pressure extremes exist, company says. New packing suitable for temperatures between −50 and 400 F, pressures to 250 psi. New packing gland assembly also available designed for better guidance of stem.

Fuel Oil Valve . . .

. . .for metering control of fuel oil in industrial oil burner installations — *Atlas Valve Co., Dept. HPAC,* 280 *South St., Newark, N. J.*

Type "235-1" unit designed to control, maintain certain flow ratio between two variables such as air and fuel oil into an oil fired steam boiler, company says. Valve bodies normally cast iron but any alloy can be furnished; trim is stainless steel. Sizes range ½ to 1 in. IPS, with larger sizes available. Choice of seating arrangement includes single, balanced needles; v-ports.

Control Units . . .

. . .designed to raise fuel oil to any height for use in overhead heaters — *N. E. Hite Mfg. Co., Dept. HPAC,* 303 *N. Elizabeth St., Chicago* 7.

Operation of new unit governed automatically by two heavy duty mercury switches which control two sets of floats. One set maintains level of oil in feed tank, automatically stops pump if oil feed line is broken or tank runs dry. Another set stops pump in case first set fails to cut it off at high level, company says.

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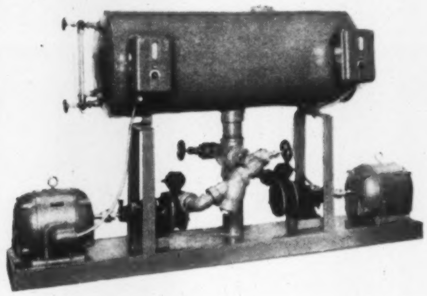

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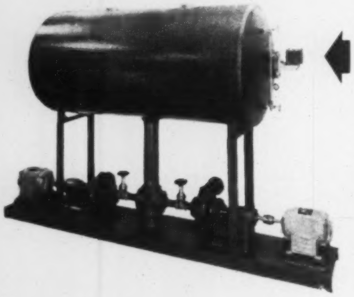
Capacities up to 100,000 sq. ft. EDR at 200 psi. Five types of units to meet all operational requirements and specifications. They include units with overhead receivers for high temperatures as well as underground receivers for buried returns, steel, cast iron and lined receivers.



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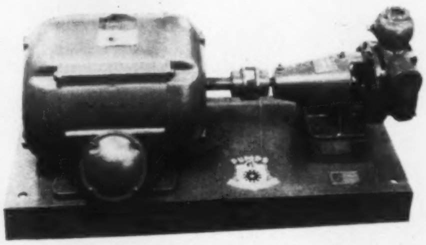
Packaged units designed to combine the function of boiler feeding and fresh water make-up. High receiver prevents flashing when traps begin to leak. Made in a single and duplex construction for capacities to 100,000 sq. ft. at 200 psi.



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Made for capacities to 200 gpm. at pressures to 200 psi. in many metals for corrosive chemicals as well as water. Incorporates preloaded bearings to permit positive centering of impeller without lateral bearing play. This permits high speeds without excessive wear.

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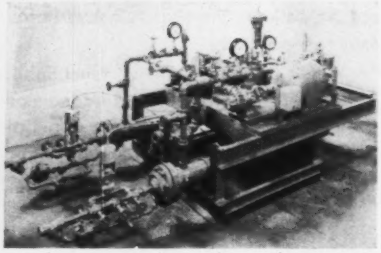

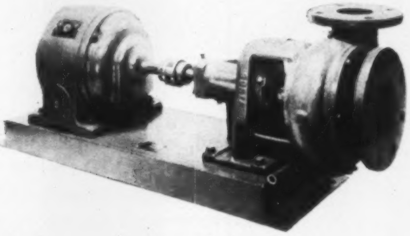

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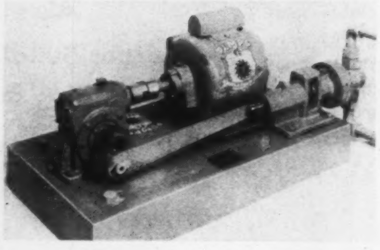

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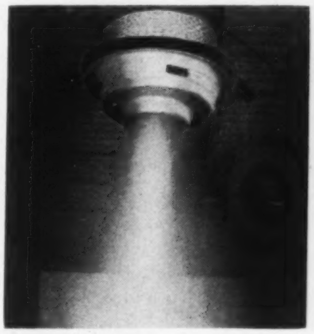

Unit Heaters . . .

. . . designed to provide even floor comfort underneath high ceilings — *Norman Products Co., Dept. HPAC, Columbus, Ohio.*

Combustion air in "Down-Blo" model drawn from outside of building through separate inlet pipe. All exhaust gases, products of combustion vented to outside under positive pressure within sealed chamber. "Radial-Flo" models also available. Both have inputs of 115,000, 85,000 Btu.

Smoke Test Gun . . .

. . . for checking air movement in heating, cooling installations—*Air Control Products, Inc., Dept. HPAC, Coopersville, Mich.*

Unit uses cigarette to produce dense, directed smoke stream to give visual check of air movement. To load: holder from pump is unscrewed, lighted cigarette inserted, holder screwed back into end of pump. Few strokes of plunger handle forces smoke through jet in proper volume, company says.

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No. 101—For high pressure, heavy duty steam plants. External oil dash pot . . . counter-weighted lever for testing and visible action. Clean, simple inner construction.

No. 102—Popular valve for general service. Internal steam dash pot eliminates chatter.

Both valves in complete size ranges, corner or elbow, semi-carbon or alloy steel bodies with trim to suit pressure or temperature needs. Ask for **Bulletin 101A**.

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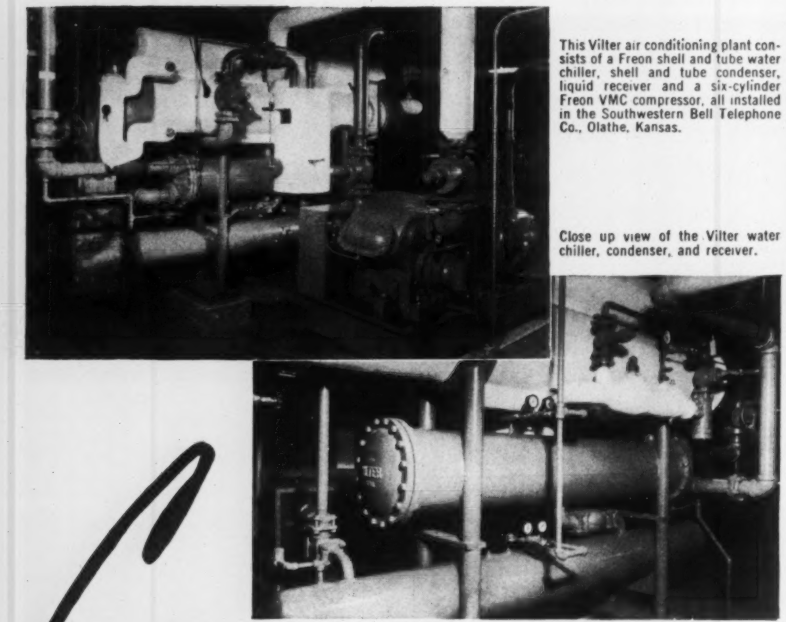


This Vilter air conditioning plant consists of a Freon shell and tube water chiller, shell and tube condenser, liquid receiver and a six-cylinder Freon VMC compressor, all installed in the Southwestern Bell Telephone Co., Olathe, Kansas.

Close up view of the Vilter water chiller, condenser, and receiver.

Custom-made CLIMATE

for busy office and toll switchboard

Vilter has brought the latest in "custom climate" air conditioning to the general offices and toll switchboard of the Southwestern Bell Telephone Company, Olathe, Kansas. Happier employees and more efficient operation is the satisfying result. Vilter equipment includes a 6-cylinder Freon VMC compressor, 16" x 10' water cooler, 16" x 7' shell and tube condenser, 12" x 10' receiver.

All components in a Vilter air conditioning system incorporate the latest in engineering skill and industry practice. VMC compressors offer maximum capacity in a minimum of space. Built-in capacity reduction permits automatic operation at reduced loads with consequent power savings. Vilter's wide range of shell and tube equipment is right in performance and right in price.

Vilter also offers a completely "packaged" water cooler—the Vilter Uni-Chiller. Shop assembled for lower first cost, the Uni-Chiller offers space-saving design, simple installation and requires a minimum of maintenance.

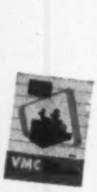
You, too, can have all the advantages of modern air conditioning and refrigeration—specify Vilter.

Equipment furnished by O'Dower Engineering Company, Vilter Distributor in Kansas City, Missouri. Mechanical Contractor, U. S. Engineering Company, Kansas City, Missouri.

Write for these helpful bulletins to The Vilter Manufacturing Company
Dept. F-715, 2217 S. First Street, Milwaukee 7, Wisconsin

Bulletin 707
Vilter Condensers
Brine Coolers
Heat Exchangers

Bulletin 631
Vilter
Uni-Chillers



Bulletin 429
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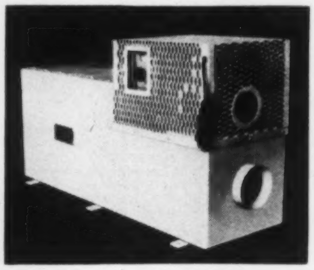
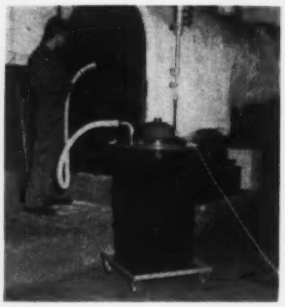


Humidity Controller . . .

. . . for delivering constant humidity air — *Universal Dynamics Corp., Dept. HPAC, Box 9797, Arlington, Va.*

New "Humitrol" maintains relative humidity level within plus or minus 0.25 percent RH, or better, in air or gas stream, company says. Unit is composed of sensing element, control system, modulating device for use with dehumidifiers, humidifiers, air conditioning equipment. Available in sizes from 20 cfm.



Drum Adaptor . . .

. . . designed to convert standard vacuum cleaner units to larger sizes—*Pullman Vacuum Cleaner Corp., Dept. HPAC, 25 Buick St., Boston.*

Large boilers, flooded areas can be cleaned with use of new product, company says. Unit may be put on 55 gal drum. "Never Clog" dry filter interchangeable with "Wet Pickup" adaptor.

Control Valve . . .

. . . designed to handle gases, liquids in high pressure drop, on-off, throttling service with dead end shutoff — *A. W. Cash Co., Dept. HPAC, Box 551, Decatur, Ill.*

Type "505" has pressure, temperature rating of 10,000 psi at −40

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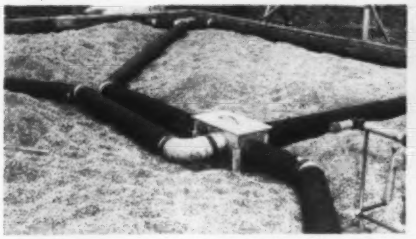
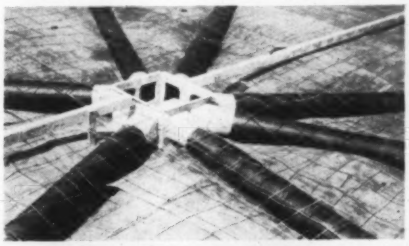




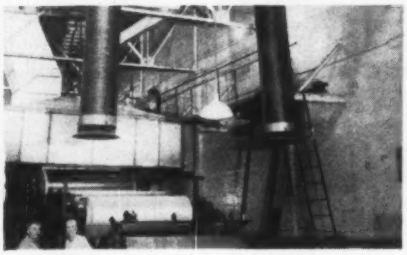
Sonoco SONOAIRDUCT Fibre Duct is a lightweight duct made especially for supply or return lines. It should be encased with a minimum of 2" of dense aggregate concrete. The minimum thickness of concrete over the loop duct should be 2½", and continuous mesh reinforcing not less than 6 x 6—10 gauge and 18" wide should be placed in the concrete and centered over the duct. Installation should be made in accordance with Sonoco Manual No. 557. When properly installed, Sonoco SONOAIRDUCT Fibre Duct will materially reduce costs without lowering the quality of construction. This fibre duct is more economical than metal, glazed tile, clay pipe, or concrete duct.

Sonoco SONOAIRDUCT Fibre Duct is aluminum foil lined for lower coefficient of air friction. The air friction loss of 8" Sonoairduct is 0.151" of water per 100 feet at a velocity of 800 feet per minute and 70° F. The black duplex kraft outer wrap retards excessive moisture penetration through the duct wall. The action of the adhesive, used in the manufacture, when subjected to normal heating temperatures, causes the duct to cure and improve with age. This action results in a product that is practically waterproof, thus preventing delamination. This fibre duct will withstand temperatures as high as 275° F indefinitely.

Sonoco SONOAIRDUCT Fibre Duct minimizes transmission of sound from furnace and from room to room. It has a heat conductivity of 0.46 BTU per hour per square foot per degree F per inch of thickness. This insulation value prevents hot spots in the slab above the encased duct, resulting in more heat to the diffusers or registers where it is desired.

Available in 23 sizes, 2" to 36" I.D., up to 50' long. Can be sawed to exact lengths on the job.

Large diameters are ideal for commercial and industrial heating-ventilating



Sonoco SONOAIRDUCT Fibre Duct is available in diameters up to 36" I.D. The larger sizes have been used in a wide variety of commercial and industrial heating and ventilating installations. The low initial cost and handling ease, due to lightweight, long lengths, saves money and installation time.

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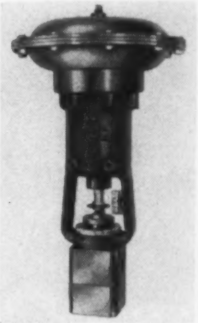
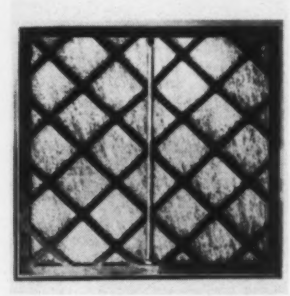


to 400 F. Available with direct or reverse action actuator with standard 3-15, 6-30 psi instrument air range. Body made of forged stainless steel with hardened stainless steel trim. Connection sizes are ½, ¾ in.



Air Filter . . .

. . . utilizing the cut chipboard grille work — *Pittsburgh Plate Glass Co., Dept. HPAC, 632 Fort Duquesne Blvd., Pittsburgh 22.*

"Glasfloss Safety Grille" prevents hand, wrist cuts from broken metal, company says. Strength attributed by manufacturer to cut sections of chipboard with ends firmly fastened. Available in all standard sizes for heating, air conditioning, ventilating applications.

Dust Collector . . .

. . . with cyclone separator—*Dustender Co., Dept. HPAC, 3627 Pontiac Rd., Ann Arbor, Mich.*

New "WWB5" unit features minimum floor space requirement, 1/3 hp ball bearing motor, built-in cyclone separator which affords reduction of dust load on filters, company says. Filter made of flameproofed material of dense weave designed to remove

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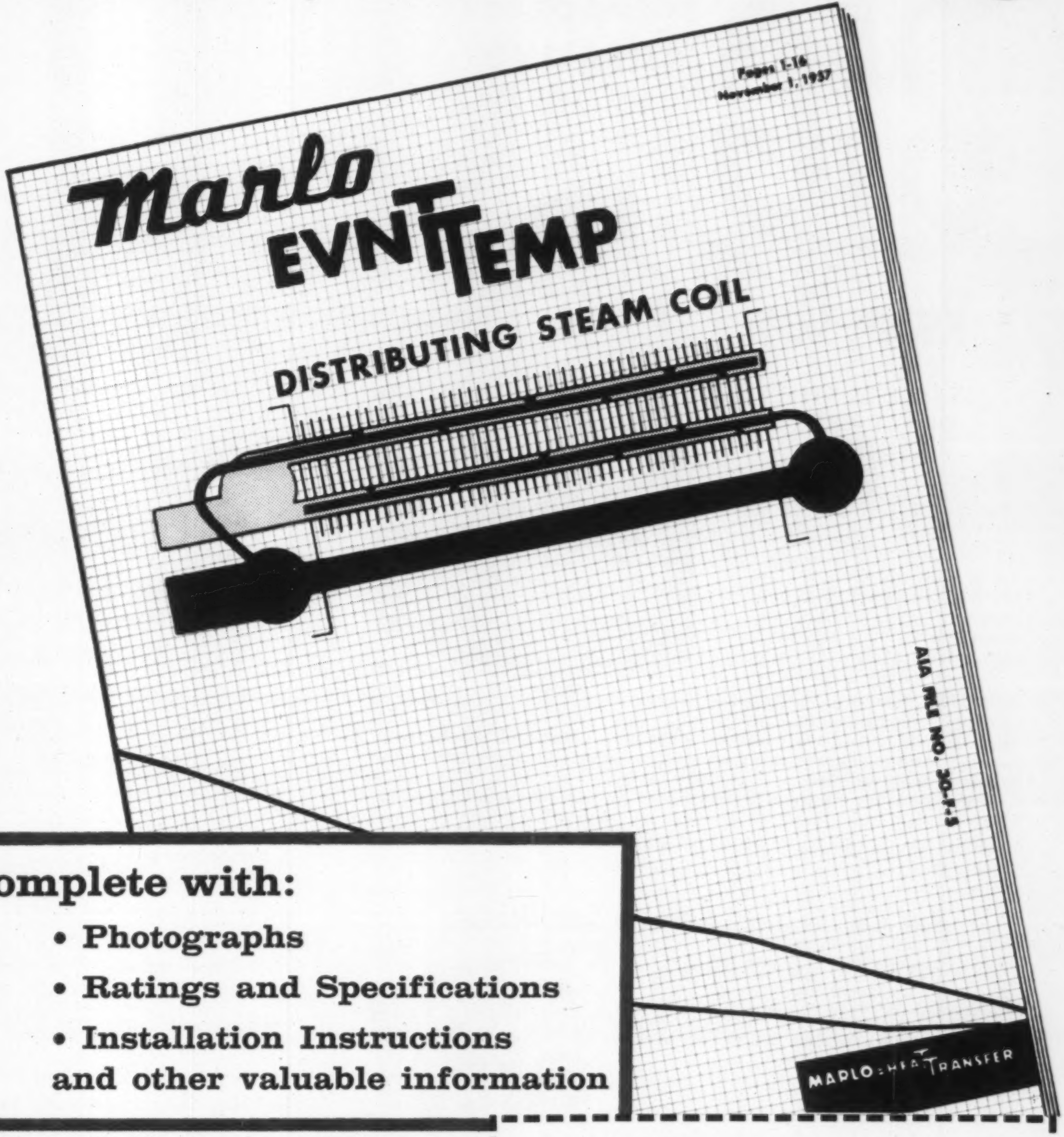
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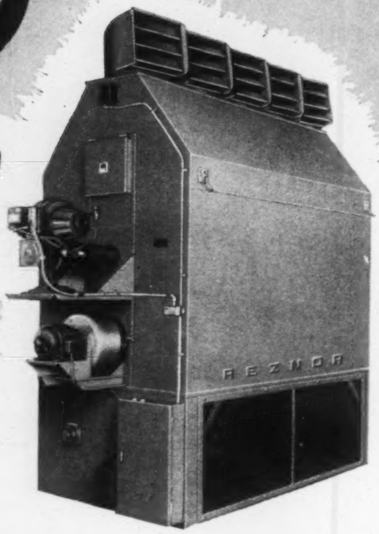
STAINLESS STEEL DIRECT FIRED HEATERS



These units are designed for heating factories, warehouses, garages, airplane hangars, gymnasiums and other large open areas. They pick cold air up off the floor, distribute heated air overhead at high velocity—either direct or thru ducts. In addition to space heating installations, Reznor-Olson heaters are well-suited for use in make-up air systems and in drying and other process applications.

Reznor-Olson heaters are available in ten sizes — 400,000 to 2,000,000 Btu — with gas, oil or dual-fuel burners. They may be floor mounted for top discharge or suspended for down-blast or horizontal discharge.

New Bulletin gives Complete Specifications

Complete specification information — including dimensions, control details, temperature rise, air delivery and fuel consumption — is included in a new bulletin, F-57A-RO. If you don't have a copy of this bulletin in your files, just fill out and mail the coupon below. Do it today.

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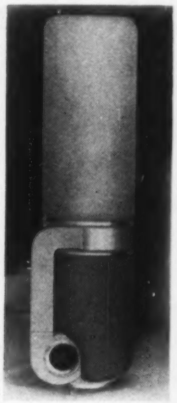
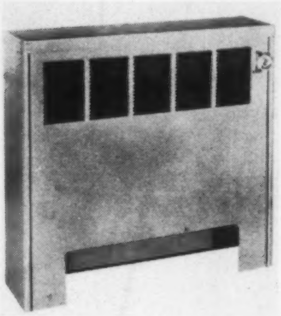


dust particles not taken out by separator. Available with 5 in. diameter inlet which rates 600 cfm at 2 in. static pressure.



Convectors . . .

. . . with knob dampers — *Embassy Steel Products, Dept. HPAC, 890 Stanley Ave., Brooklyn 8.*

Dampers adjusted with one turn of knob, can be set to any desired opening, company says. When fully closed, they completely cover outlet grille. Convectors designed for commercial, institutional use. Elements may be of either steel or copper, depending upon requirements of particular installation.

Plastic Shim Stock . . .

. . . with double identification feature — *Chicago-Wilcox Mfg. Co., Dept. HPAC, 7701 S. Avalon Ave., Chicago 19.*

"Wil-Pak" available in six basic gages with each thickness identified by distinctive color, gage number. Unit has decomposition point in excess of 400 F., company says.

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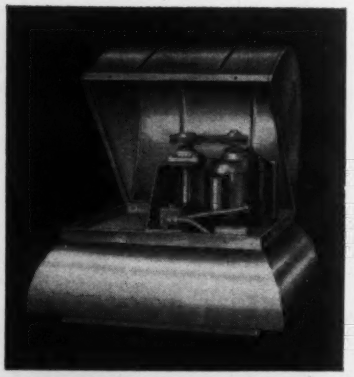

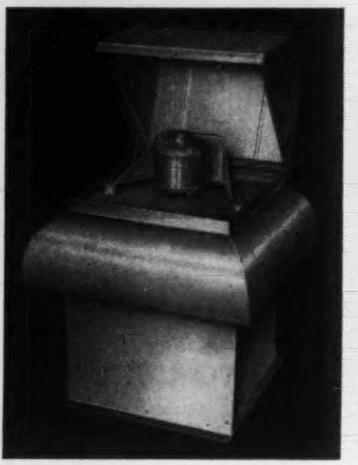

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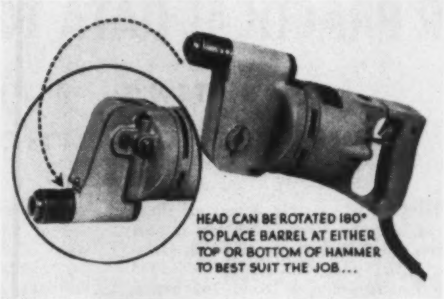
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. . . with head that can be rotated 180 deg — *Super Slugger Co., Dept. HPAC, 1020 Broadway, Bedford, Ohio.*

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...for face and bypass unit ventilators — *Barber-Colman Co., Dept. HPAC, 1300 Rock St., Rockford, Ill.*

Controls consist of (1) control motor, changeover relay assembly, (2) thermostat assembly which includes unit mounted dual element room and discharge controller and changeover strap on thermostat both wired to single plug for attachment to control motor. Spring return motor operator closes outdoor air damper on fan shutdown or power failure, also opens face damper for maximum convection during winter when fans are stopped on night cycle, company says. Control changeover from heating to cooling is automatic.

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...in variety of models — *Penn Controls, Inc., Dept. HPAC, Goshen, Ind.*

Unit available in 3/8, 1/2, 3/4 in. sizes; can be adjusted with standard service wrench or screwdriver. Markings on spring housing indicate range area.

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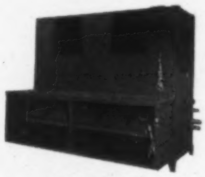

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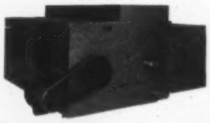

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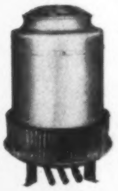

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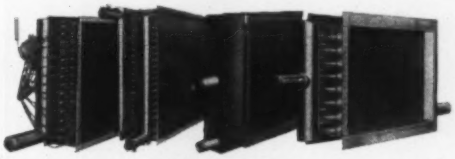

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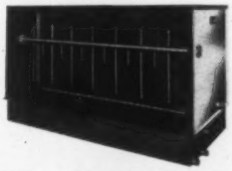

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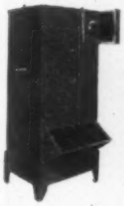

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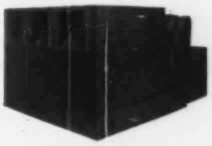

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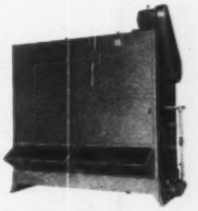

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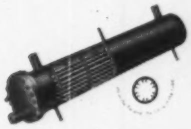

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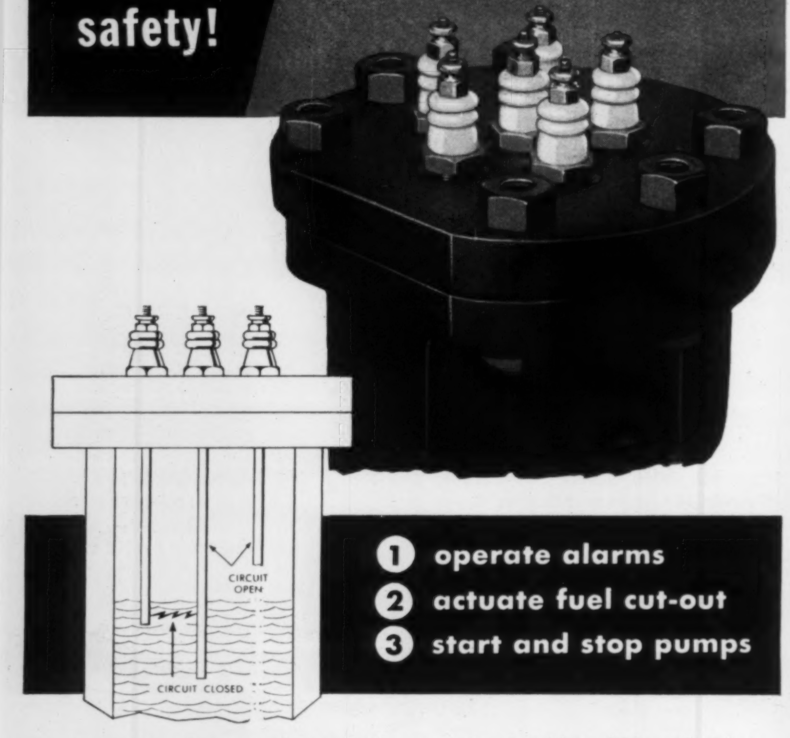

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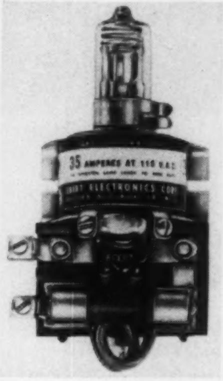
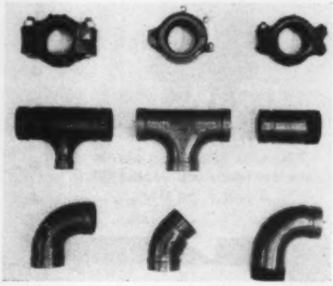


Fused Plunger Relays . . .

. . . designed to offer protection against overload—*Ebert Electronics Corp., Dept. HPAC,* 212-26 *Jamaica Ave., Queens Village* 28, *N. Y.*

Units suitable for use in motor control, lighting control, heater power, furnaces, welding equipment, etc. Models of two-, three-pole construction for loads to 60 amp at 115 volts a-c available. Hermetically sealed mercury-to-mercury contacts incorporated.



Fittings . . .

. . . for lightweight, rolled groove tubing — *Victaulic Co. of America, Dept. HPAC, Elizabeth, N. J.*

New product line of company includes full flow elbows, tees, reducing tees, reducers for use with either lightweight steel or aluminum pipe with rolled groove ends. Adapter nipples, other adapter units for connecting grooved end piping to threaded, flanged, welded outlets also available. All fittings interchangeable, can be quickly installed with any of three styles of "Victaulic" couplings—standard, lightweight, or snap joint, company says.

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provide fast, clean heat for a variety of applications

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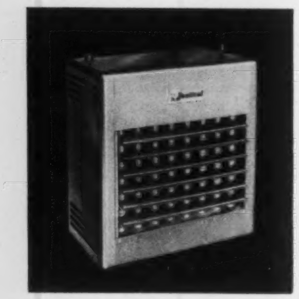
gas heating offers many advantages

FACTS about JANITROL gas-fired UNIT HEATERS



Because of their versatility and efficiency, combined with low cost, Janitrol unit heaters can be installed to advantage in most every commercial or industrial building.

They are installed easily, without sacrifice of floor space, and without expensive duct work. They are completely automatic. They direct heat where it's needed, and only when it's needed—important for operating economy. They offer versatile "dual fuel" performance—use natural or LP gas; may be switched from one fuel to the other automatically. As for durability and low maintenance, let this fact guide you. Janitrol's exclusive Multi-Thermex heat exchanger is so enduring that replacements for any cause have been less than ¼ of 1% in over two million heat exchanger tubes produced since 1940!

Whether for heating a factory with acres of floor area, or a modest neighborhood store, Janitrol gas-fired unit heaters meet every requirement . . . *well within* the building budget. Use them on your next job.

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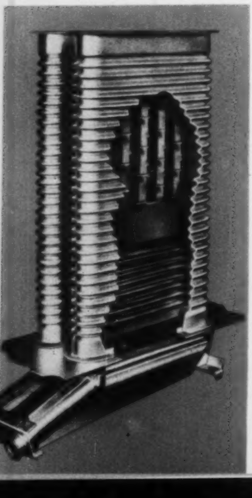

Virtually indestructible! Corrugated metal walls—aided by internal baffles—speed heat from heat exchangers into air stream. Resist corrosion and cracking. Ampli-Fire ribbon flame burner is specially designed and positioned to prevent direct contact of flame on metal. Assures freedom from damaging "hot spots" and internal stresses. Only Janitrol gas heaters have this time-proved feature!

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Designed for installation in a duct where the air is circulated by a remote blower. Especially adaptable to heating applications for industrial processing and for heating in combination with cooling. Low in cost, saves installation time and labor. Five sizes: Rated input from 85,000 to 450,000 Btu/hr.

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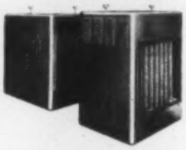
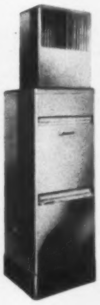


Allows air delivery from greater heights and against greater static resistances, permitting use with ducts. Provides effective heating over a wider range when outlet nozzle area is reduced, and blower adjusted to increase outlet air velocity. Use with extensive supply and return duct systems. Six sizes: Rated input from 85,000 to 450,000 Btu/hr.



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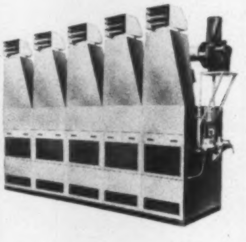

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Moffats, Ltd., Toronto, 15

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Gas Vent Elbow . . .

. . .for type "B" gas venting systems — *Dura-Vent Corp., Dept. HPAC, 2525 El Camino Real, Redwood City, Calif.*

Turns of any angle from zero to 90 deg can be made with one doublewall, air insulated unit, company says. One of new features cited by manufacturer is continuous insulating air space between inner, outer walls. While design gives complete turning freedom, joints said to be snug in any position. Interior of elbow is smooth.

Temperature Controls . . .

. . .designed for use in hazardous locations where explosive vapors, gases are present — *United Electric Controls Co., Dept. HPAC, 85 School St., Watertown, Mass.*

Temperature settings on "B95" made by rotating single turn knob, pointer against calibrated dial. Any one of three standard switches available: normally open, normally closed, double throw with no neutral position. All switches single pole, suitable for 180 F ambient temperatures, rated for 15 amp at 115/230 volts a-c. Thermal system consists of bellows contained in bellows housing. Bellows—filled with temperature sensitive liquid—expands or contracts with heating or cooling, activating snap action switch at desired preset temperature point, company says. Units have adjustable ranges between zero, 425 F.

Single Stage Regulators . . .

. . .designed to provide high delivery rate, to maintain constant delivery pressure — *Air Reduction Sales Co., Div. of Air Reduction Co., Inc., Dept. HPAC, 150 E. 42nd St., New York 17.*

No dropoff present in working pressure as cylinder pressure decreases; gas is more completely exhausted from cylinder, company says. "8100" series includes regulators engineered to meet flow rate demands including heating, heat treating, lead burning, welding, cutting, etc.

Room Air Conditioners . . .

. . .with increased cooling power—*York Corp., Dept. HPAC, York, Pa.*

Each of nine new models increases cooling capacity approximately 30 percent while decreasing size of unit 63 percent, manufacturer says. Sizes range 1 to 2 hp in cooling capacity. "Power Mite," designed to cool space 1428 times its size, is 22 in. wide, 14 in. high, 14⅞ in. deep. Available in two "Custom" models, one "Supreme" model. "Compressomatic Supreme" features maze coil construction, staggered tubes, rippled aluminum fins. New "Senior" series conditioners designed for multispace conditioning.

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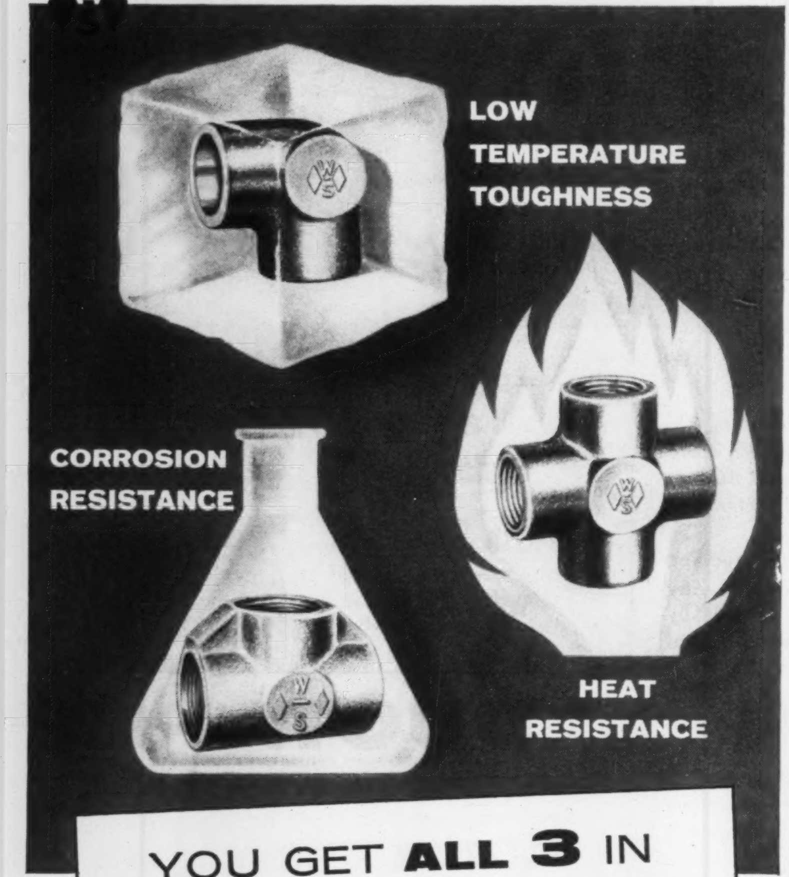

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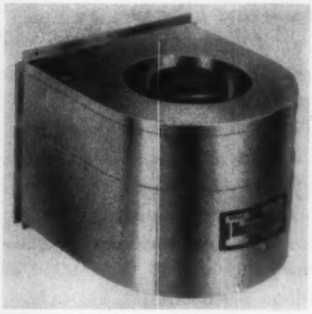
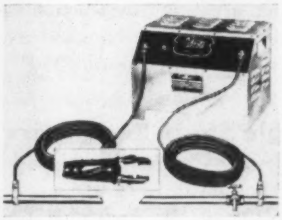


Plenum Humidifier . . .

...for adding moisture to circulating air in commercial and industrial duct systems — *Herrmidifier Co., Dept. HPAC, Neffsville, Pa.*

New 1958 model "400" has 0.5 gal per hr capacity. Unit consists of fan cooled motor isolated from all moisture, stainless steel housing, trouble free adjustable float valve, manufacturer says. Fan circulates 110 cfm and operates on 110 volt, 60 cycle, a-c current.



Pipe Thawer . . .

. . . designed to operate on all 110 volt, 15 amp electric outlets — *Trindl Products, Ltd., Dept. HPAC, 1807 S. Clark St., Chicago 16.*

Operation procedure outlined: pipe clamps of unit attach to frozen pipe; unit is plugged into electric outlet; frozen pipe thaws out quickly, company says. Also suitable for sweating together copper and brass tubes, pipes. In addition, thawer may be used for variety of soldering, brazing operations.

Condensation Returns . . .

...in simplex, duplex units—*Aurora Pump Div., New York Air Brake Co., Dept. HPAC, 80 Loucks St., Aurora, Ill.*

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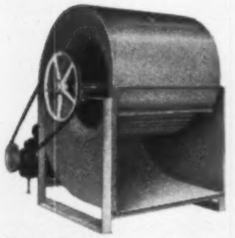
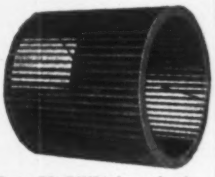
your dependable low cost source of supply for

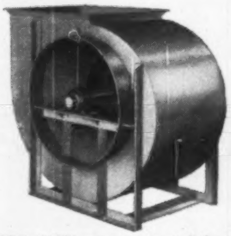
Power Fan Equipment



Type WD, DWDI centrifugal fan.

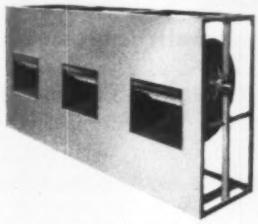


Type FC, DWDI fan wheel.

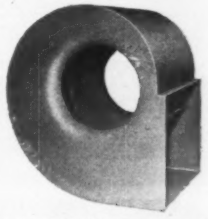


Type BBC, SWSI arrangement 3 fan.

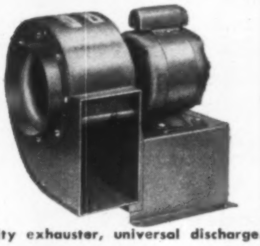
Type BBC fan wheel, SWSI class 2.



Triple BFC Blower Assembly



Type W, DWDI light duty fan housing.



Utility exhauster, universal discharge.

BBI, all-riveted blower wheels, SI-SW and DI-DW.

Barry equipment includes ventilation fans in forwardly curved blade and non-overloading types, utility and industrial exhausters, belted ventilating and exhaust sets for easy installation, induced draft fans complete with shaft coolers, and high pressure exhausters for dust and material handling. Sizes range from 6" to 73" impellor diameter. All arrangements are available.

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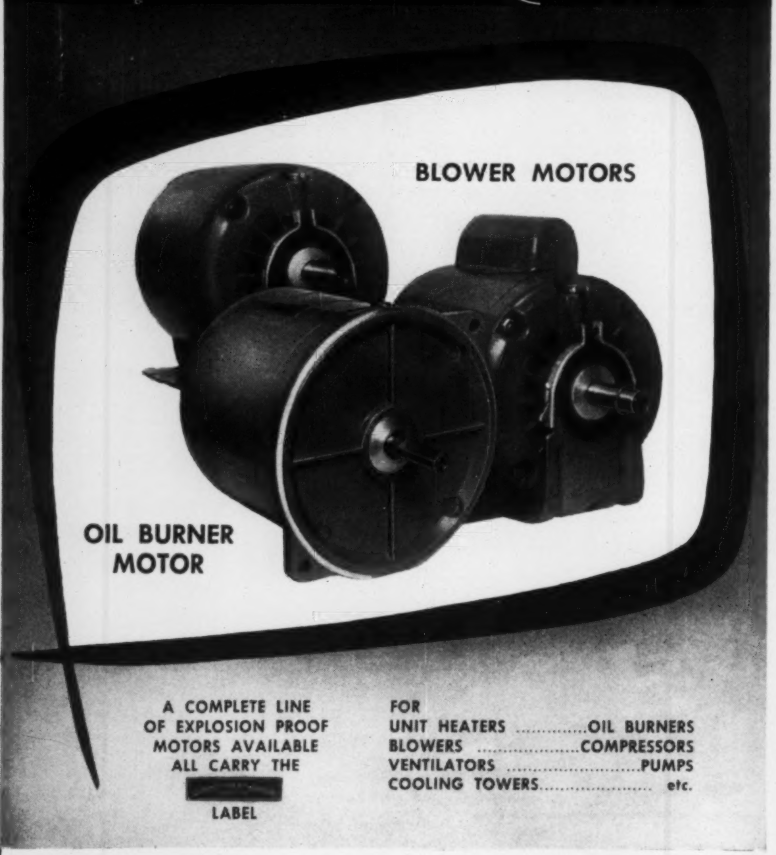
HEATING
AIR CONDITIONING
MOTORS



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COOLING TOWERS...................... etc.

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1/2 KW thru
2000 KW

Yours for the Asking

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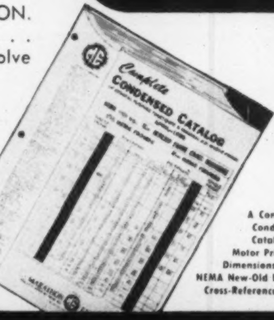

A Complete Condensed Catalog of Motor Prices & Dimensions with NEMA New-Old Frame Cross-Reference List

SINCE 1913
MARATHON ELECTRIC
HOME OFFICE AND FACTORY, WAUSAU, WIS. FACTORIES AT ERIE, PA. AND EARLVILLE, ILL.
SALES OFFICES IN PRINCIPAL CITIES

EQUIPMENT DEVELOPMENTS

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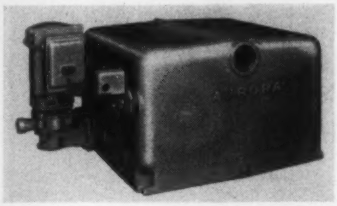
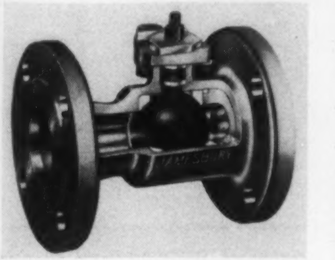


Sizes range 500 to 150,000 EDR, 10 to 125 psi; receivers 6 to 126 gal. Speeds of 1750 or 3500 rpm available. Units are close-coupled end suction centrifugals suitable for condensate to 212 F. Bronze impellers precision machined, balanced. Low return inlets permit convenient connection to return lines close to floor, company says. Three discharge positions, two inlet positions designed to promote flexibility of each unit.



Flanged Ball Valves . . .

. . . in sizes ½ to 2 in.—*Jamesbury Corp., Dept. HPAC, Worcester, Mass.*

New units offer full pipeline flow, leakage prevention, elimination of contamination; require minimum maintenance, company says. Among other features cited: unit body construction, positive shutoff, low torque over complete pressure range from vacuum to full rated pressure high flow capacity with minimum friction loss, interchangeable seats and seals. Supplied with flanged ends in pipe sizes ½ to 8 in.; with screwed ends in ¼ to 2 in. sizes.

Five Bladed Fans . . .

. . . designed to provide reduced axial depth with optimum air flow, high operating efficiency—*Torrington Mfg. Co., Dept. HPAC, Torrington, Conn.*

Reduced axial depth achieved with added blade and by original design of symmetrically patterned cambered blades, company says. Avail-

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with
FAIRMONT
ALUMINUM
coiled sheet

When choosing aluminum coiled sheet for heat transfer products, alert manufacturers demand deep-drawing, non-earing stock for rapid as well as uniform forming of collars without cracking or buckling. Close adherence to required gauge tolerance is of prime importance in manufacturing cost.

The low-cost, highly efficient product you've made from Fairmont aluminum will give years of use to satisfied customers, because Fairmont aluminum resists corrosion and breakdown.

Along with rigid quality control, Fairmont offers "individualized" attention to manufacturers' requirements for coiled and flat sheet in 1100, 3003, 5005, 5050 and 5052 alloys. Let us show you why Fairmont aluminum is being specified by the foremost heat transfer product manufacturers. Write or call today for details.

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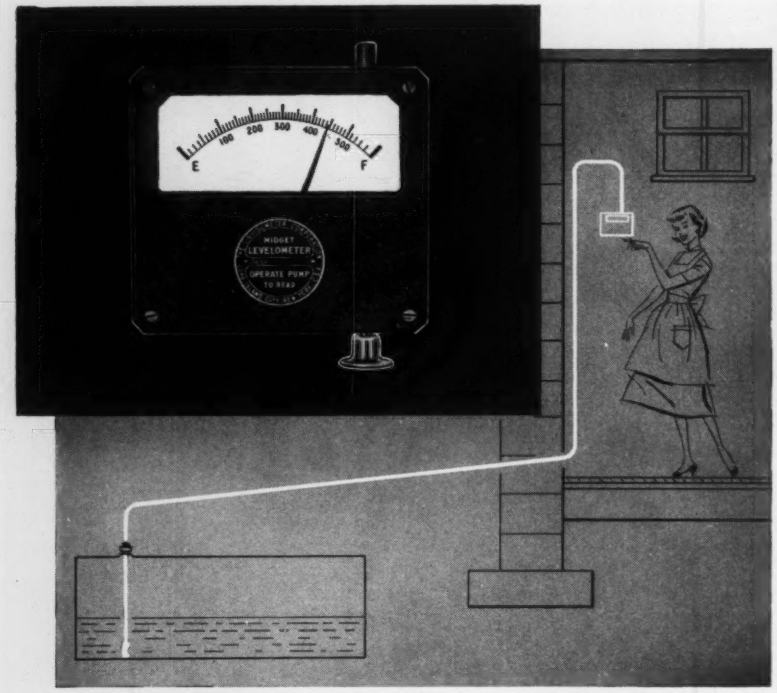


LOW-PRICED...QUALITY MIDGET LEVELOMETERS

GIVE DEPENDABLE INDICATION OF TANK CONTENTS

Midget Levelometers provide home owners and plant engineers with reliable, easy-to-read, trouble-free indication of fuel supply. The dangers and inconvenience of old-fashioned dip sticking and taping methods are eliminated. In the plant, fire and labor hazards are cut . . . costly shut-downs caused by lack of fuel are avoided.

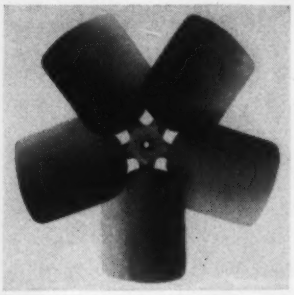
Levelometers operate on an adaptation of the hydrostatic principle. They establish a balance between the height of the liquid to be measured and an indicator. Dial type indication provides maximum readability. Levelometers are precision built, rugged, easy to install and constructed of the finest materials. Approved by UL, FM and BSA, New York, they are used for gaging fuel oil, diesel oil, gasoline and a variety of other liquids.

Levelometers are available in several sizes for a wide variety of applications. For complete information write Dept. A

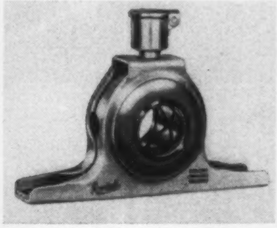
LIQUIDOMETER INSTRUMENTS

THE LIQUIDOMETER CORP.
SKILLMAN AVENUE AT 36TH STREET, LONG ISLAND CITY 1, N. Y.

EQUIPMENT DEVELOPMENTS
Continued



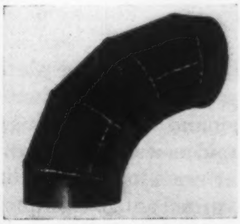
able in 16, 18, 20 in. sizes; designed particularly for such applications as cooling towers, central and remote air cooled condensers.



Pillow Blocks . . .

. . .for shaft sizes 1 3/16, 1¼ in.—*Randall Graphite Bearings, Inc., Dept. HPAC, Box 839, Lima, Ohio.*

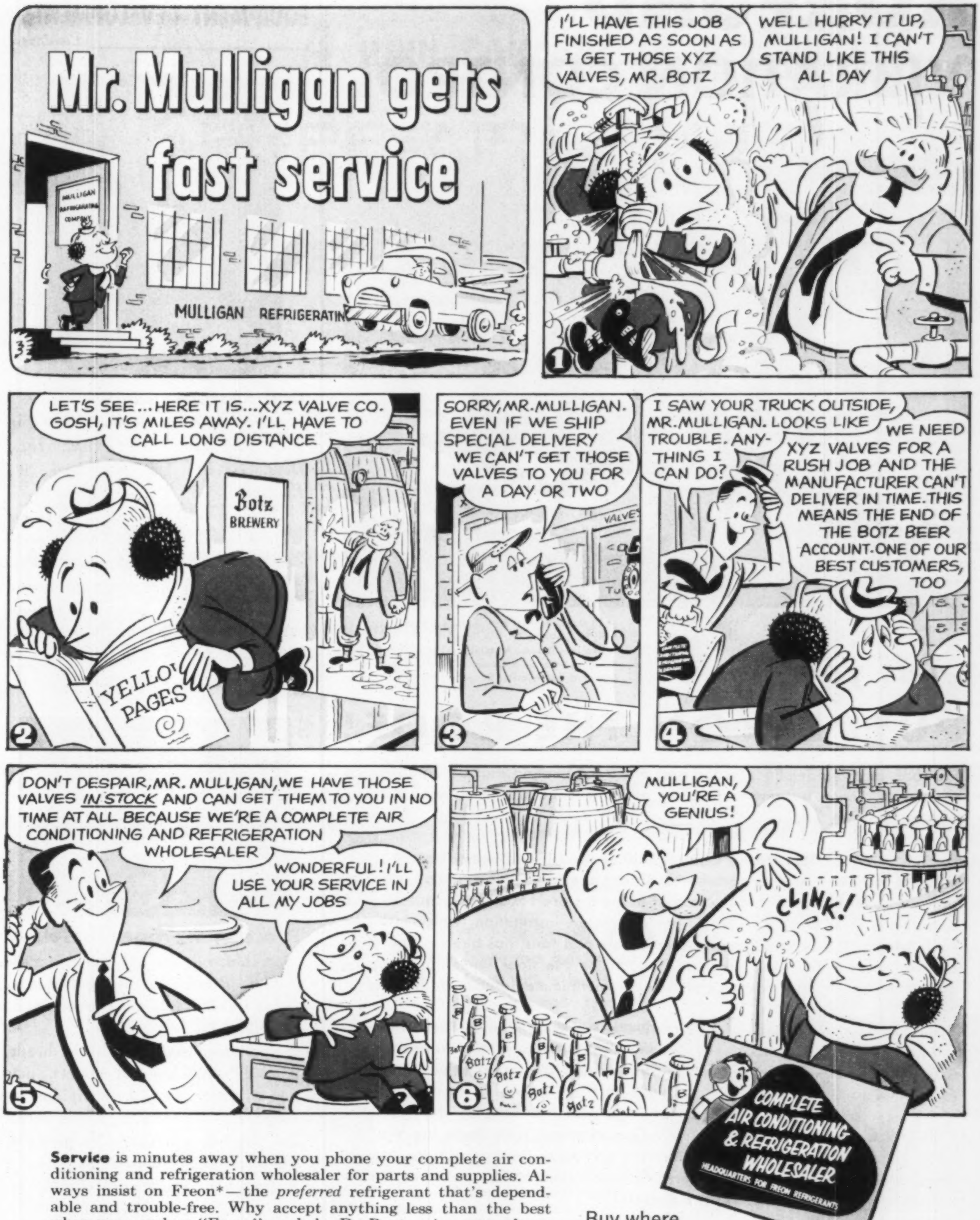
Units have graphited cast bronze bushings. Among features cited by company: automatic controlled double lubrication, automatic self alignment, quietness, maintenance free operation for long periods.



Blow Pipe Elbows . . .

. . . of arc welded construction — *Wer-Coy Fabrication Co., Dept. HP-AC, 2232 Beniteau St., Detroit 14.*

Units are 5, 7 piece, available in 14, 16, 18 gage black iron or galvanized with sizes 3 to 20 in. All standard degree of angles from 15 to 90 deg. Variety of throat radii—from 2 in. to 1½ times diameter of pipe—also available.


Mr. Mulligan gets fast service
MULLIGAN REFRIGERATING COMPANY
MULLIGAN REFRIGERATIN
I'LL HAVE THIS JOB FINISHED AS SOON AS I GET THOSE XYZ VALVES, MR. BOTZ
WELL HURRY IT UP, MULLIGAN! I CAN'T STAND LIKE THIS ALL DAY
1
LET'S SEE... HERE IT IS... XYZ VALVE CO. GOSH, IT'S MILES AWAY. I'LL HAVE TO CALL LONG DISTANCE
Botz BREWERY
YELLOW PAGES
2
SORRY, MR. MULLIGAN. EVEN IF WE SHIP SPECIAL DELIVERY WE CAN'T GET THOSE VALVES TO YOU FOR A DAY OR TWO
VALVES
3
I SAW YOUR TRUCK OUTSIDE, MR. MULLIGAN. LOOKS LIKE TROUBLE. ANYTHING I CAN DO?
WE NEED XYZ VALVES FOR A RUSH JOB AND THE MANUFACTURER CAN'T DELIVER IN TIME. THIS MEANS THE END OF THE BOTZ BEER ACCOUNT-ONE OF OUR BEST CUSTOMERS, TOO
4
DON'T DESPAIR, MR. MULLIGAN, WE HAVE THOSE VALVES IN STOCK AND CAN GET THEM TO YOU IN NO TIME AT ALL BECAUSE WE'RE A COMPLETE AIR CONDITIONING AND REFRIGERATION WHOLESALER
WONDERFUL! I'LL USE YOUR SERVICE IN ALL MY JOBS
5
MULLIGAN, YOU'RE A GENIUS!
CLINK!
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Service is minutes away when you phone your complete air conditioning and refrigeration wholesaler for parts and supplies. Always insist on Freon*—the *preferred* refrigerant that's dependable and trouble-free. Why accept anything less than the best when you can buy "Freon" made by Du Pont—pioneer producer of safe refrigerants?

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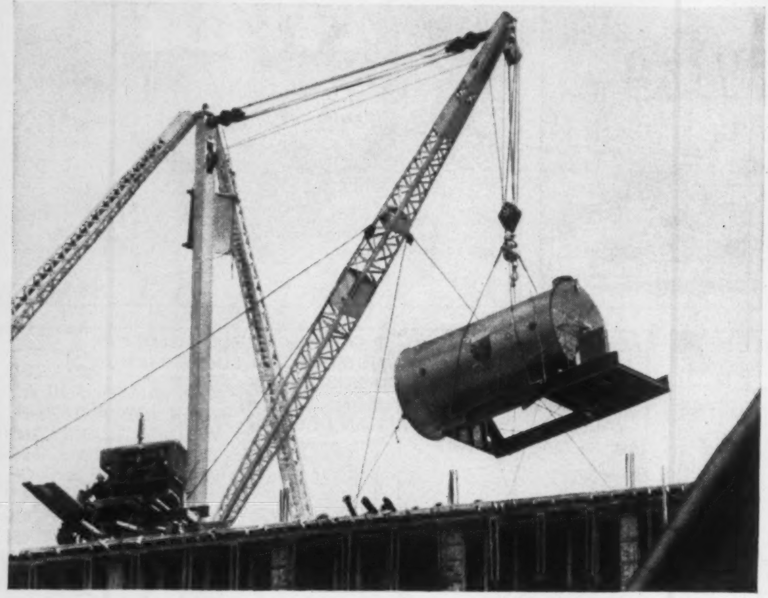
KORFUND
VIBRATION CONTROL



1500 Massachusetts Ave. Corp.—Owner
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lets you

PUT 'EM ON THE ROOF!

The roof, or an upper floor, is the best place for heating and air conditioning equipment, keeps basements free for other revenue-producing uses such as parking, storage, etc.

Korfund Vibration and Noise Control units let you install heavy boilers, compressors, fans, etc., without transmitted vibration to floors below. The photograph shows a boiler being hoisted to the roof of the 8-story 1500 Massachusetts Ave. apartments in Washington, D. C. The completed installation, which included Korfund-mounted boilers, pumps, compressors and fans, has been in operation for well over a year now, and the tenants on the floor immediately below don't even know of the existence of the equipment immediately over their suites.

This is just another example of the effectiveness of Korfund units. Their efficiency did not come about by accident — it's the result of more than a half-century of experience in the vibration and noise control field. Why not put this experience to work for you?

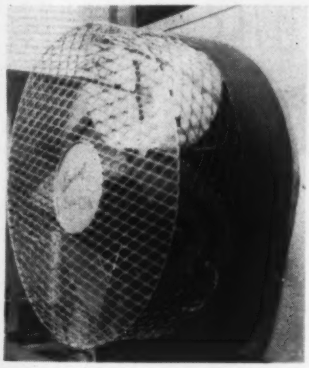
Write for a copy of the booklet, "Air Conditioning Goes Up in the World," which describes Korfund's role in vibration and noise-free upper floor installations. We'll also include a copy of "Vibration Control Specifications for Air Conditioning Equipment." Ask for Bulletin 31.

For specific recommendations contact us or one of the 46 local Korfund offices. Look under "Korfund" in your local Telephone Directory or in Thomas' Register.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL
SPRINGS RUBBER CORK

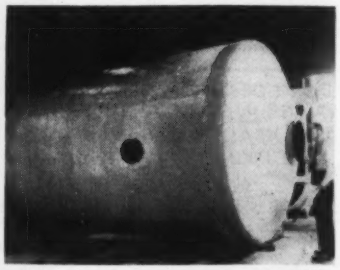
48-01F Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal



Coil System . . .

. . . using interchangeable condensor and evaporator—*Silvercraft, Inc., Dept. HPAC, 120 S. Floyd St., Louisville.*

Unit provides efficient cooling without need for water, holds pressure constant, manufacturer says. Available in 1 ton size and multiples. Installation may be custom tailored to specific needs with utilization of new system, according to company.



Process, Storage Vessels . .

. . . reinforced with solid plastic glass —*Heil Process Equipment Corp., Dept. HPAC,* 12901 *Elmwood Ave., Cleveland* 11.

Employing standard dished heads, flanged manholes and outlets, new type of material—called "Rigidon"—suited for applications where corrosion due to chemicals is involved, company says. Vessels in 2 to 9 ft diameters to be manufactured.

Air Handler . . .

. . . for commercial use — *Rheem Mfg. Co., Dept. HPAC, 7600 S. Kedzie Ave., Chicago 29.*

Unit, weighing 150 lb, houses evaporator coil, twin blowers with in-

A new concept in air filters

PURE-AIR FILTER

offers GREATER EFFICIENCY-LOWER COSTS

The PURE-AIR FILTER CONSISTS of a highly efficient filter pad of UN-OILED synthetic fibers supported by a cadmium plated permanent metal frame.

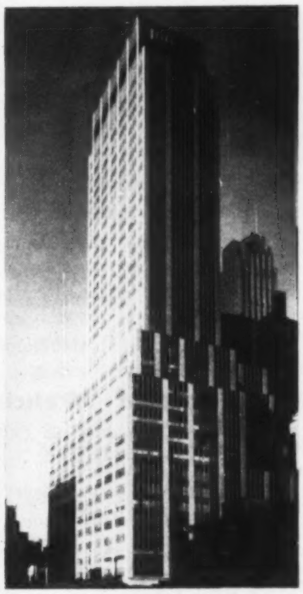
There is nothing to wash, dry or re-oil, simply dispose of filter pads when dirty. Cost of replacement pads is far less than conventional throw-away filters.

PURE-AIR filter pads are made of non-woven synthetic fibers bonded into a fluffy blanket-like pad with millions of microscopic air passages — that's why they stop DIRT not AIR. PURE-AIR filter pads are available in a wide range of efficiencies and densities to meet all requirements. For special application, write for additional information.

PURE-AIR filter replacement pads weigh about one (1) ounce each, reducing labor costs and storaging facilities.

◀ ◀ ◀ *Removal of pad is simple . . . the retainer ring is pulled out, snapped back when the new PURE-AIR pad is in place.*

. . . and here are two proven PURE AIR *installations*



◀ ◀ ◀ 100 PARK AVENUE This building was originally furnished with a throw-away type filter, and for the past three years has been using a permanent metal viscous coated filter. 100 Park Avenue has switched over and is now using the PURE-AIR FILTER throughout the entire building.

425 PARK AVENUE ▶ ▶ ▶ This is a brand new building originally equipped with a heavy duty, low velocity, permanent type, viscous coated filter, which represented a capital investment of $5,000. Exhaustive tests, however, resulted in a change to PURE-AIR FILTERS, because a better job of filtering was obtainable at a lower operating cost.

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RELIABLE PROTECTION
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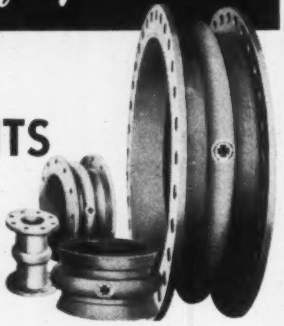

Custom-built to meet specific requirements in sizes from 3/8" I.D. to 96" I.D., for pressures up to 125 lbs. P.S.I. and/or vacuum. They are available in Right Angle and Sleeve Types, as well as "Flang-Lok"; single or multiple arch; tapered; offset; and rectangular.

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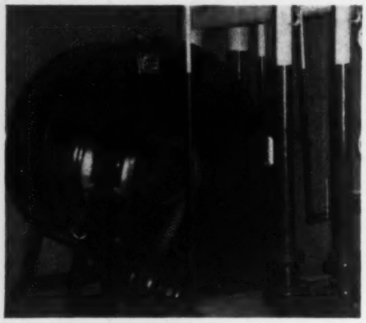
SENSITIVE RESPONSE TO PRESSURE. Only slightest pressure required to create movement in the joint, in any direction. Stress on metal pipe or other connected member reduced to absolute minimum.

EASIER TO INSTALL. Light in weight . . . short face-to-face dimensions . . . retaining rings or flanges quickly aligned and bolted. No gaskets required.

"FLANG-LOK". A patented Goodall development which provides exceptional ease of installation; greater sealing face area; and a completely non-metallic seal.



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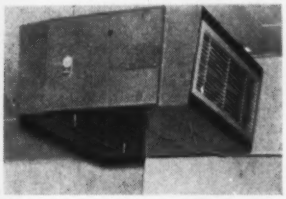
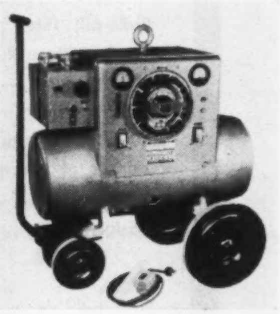
EQUIPMENT DEVELOPMENTS

Continued



dividual motors. Refrigeration, electrical, condensate drain may be connected on either side. Designed for use with "Rheemaire" condensing unit. Available in capacities 40,000, 57,000 Btu's per hr. Size is 19 × 41 5/8 × 33 3/4 in.



Gas Welding Unit . . .

. . . for motor generator arc welders — *Hobart Bros. Co., Dept. HPAC, Troy, Ohio.*

Unit designed for welding applications where extremely low ripple—1 to 2 percent—d-c welding current is required to weld stainless steel, high carbon steel, cast iron, silicon bronze, deoxidized copper, silver, company says. Complete with gas, water valves; mounted at left of welder control panel.

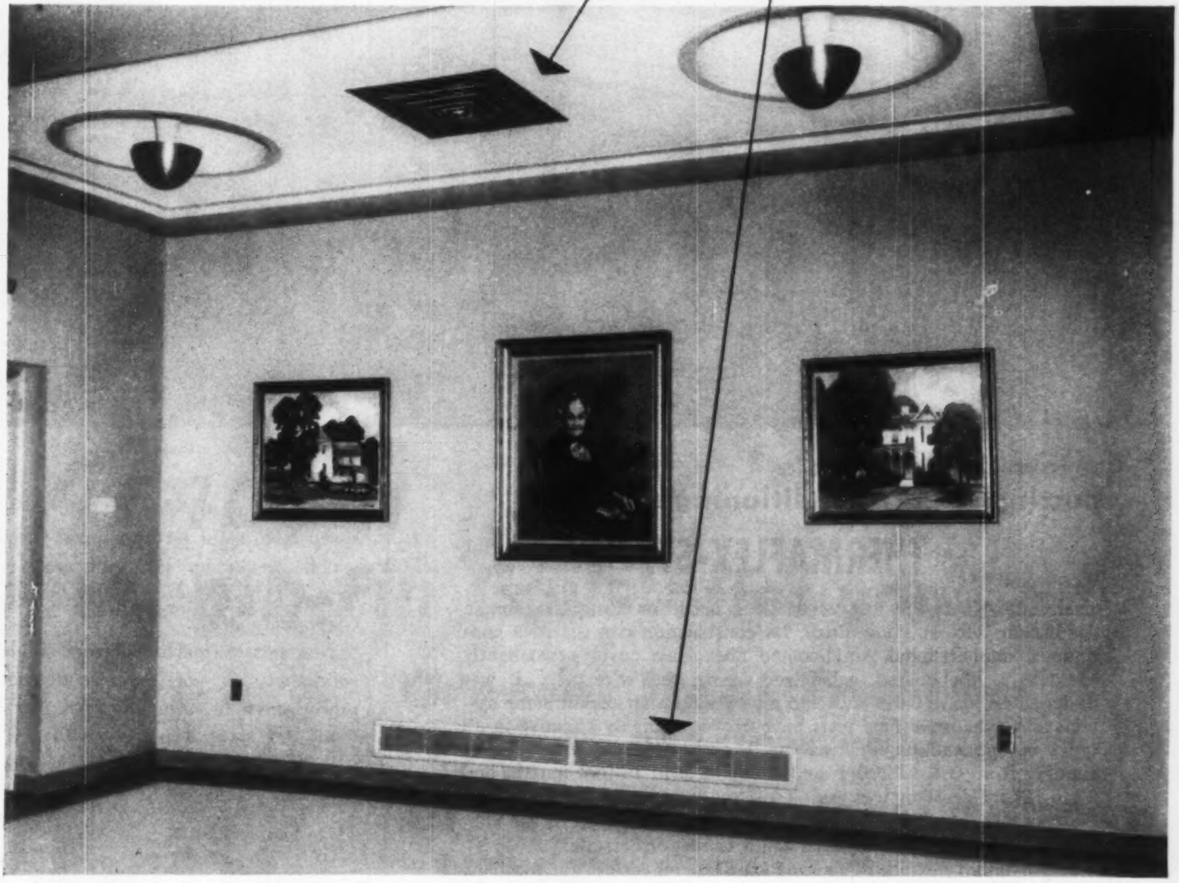
Impact Wrenches . . .

. . . designed to deliver 15 percent more torque while consuming 30 percent less air—*Albertson & Co., Inc., Dept. HPAC, Sioux City, Iowa.*

With 90 lb of air pressure at wrench, model "315" delivers 130 torque ft lb in 10 sec; model "317" delivers 185 torque ft lb in 10 sec. Units have powered iron bearing surfaces on motor endplates. Power regulator permits running series of nuts down to same degree of tight-

Perfect Air Diffusion in the Truman Library with

ANEMOSTAT AIR DIFFUSERS *and* WATERLOO GRILLES



Here is a combination—Anemostat Air Diffusers and Waterloo Return Air Grilles—which insures perfect air diffusion in the new Harry S. Truman Library in Independence, Missouri. • Anemostat Type E-1 *Aspirating* Air Diffusers provide true draftless comfort and uniform air distribution in each room of this modern building. Quality-designed Waterloo Grilles act as efficient returns in this system. • Put this performance-proved "team" of Anemostat Air Diffusers and Waterloo Grilles to work in your next heating, ventilating or air conditioning application. They are your assurance of top air diffusion performance.

For complete data on Anemostat Air Diffusers, write for Anemostat Selection Manual No. 60.

For helpful information on Waterloo Registers and Grilles, write for Catalog showing Waterloo's wide range line.

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NEW from FLEXIBLE TUBING

A low-priced flexible ducting for air-conditioning systems

THERMAFLEX-ST®

Thermaflex-ST is the answer to your need for a superbly made flexible air duct at a low price. Its construction consists of a continuous, uninterrupted, vinyl-coated fiber glass cover permanently fused to a vinyl-coated, galvanized spring steel wire helix. It was designed exclusively for low- and high-pressure air-conditioning systems and exhaustive field tests have proved it highly effective in all types of applications. Thermaflex-ST supplies air at temperatures running from 0°F to 200°F and is available in 16-foot lengths and 2" to 10" inside diameters.

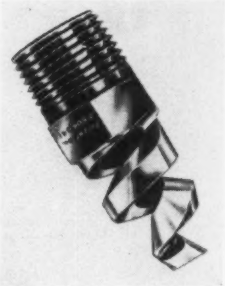
Look at these proved advantages:

1. No exposed metal or metal bands to rust or corrode.
2. Maximum flexibility. Thermaflex-ST compensates for misalignment between fixed connections . . . easily snakes through tortuous passages, around obstacles.
3. Installs without special tools, elbows, fittings or skills.
4. Lighter than any other air-conditioning ducting but extremely tough and durable.
5. Almost twice the crush-resistance of any competitive ducting.
6. Airtightness at all seams, thanks to a superior binding process.
7. Waterproof, flameproof construction.
8. Smoothly integrated bends that offer less resistance to airflow . . . result in substantial savings in power requirements.
9. Helps deaden systemic noise.
10. Retractability to 1/3 of extended length for easy handling.
11. A white inside surface for best insulation. Metallic gray outside.

For full information, write to Dept. 71.

Flexible Tubing
CORPORATION
GUILFORD, CONNECTICUT
ANAHEIM, CALIFORNIA • HILLSIDE, ILLINOIS

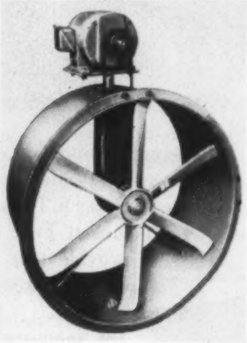
ness, company says. Both models weigh $5\frac{1}{2}$ lb each.



Nozzles . . .

. . . with spiral element that peels spray from solid jet into spiral sheet which breaks up into fine fog — *Bete Fog Nozzle, Inc., Dept. HPAC, Greenfield, Mass.*

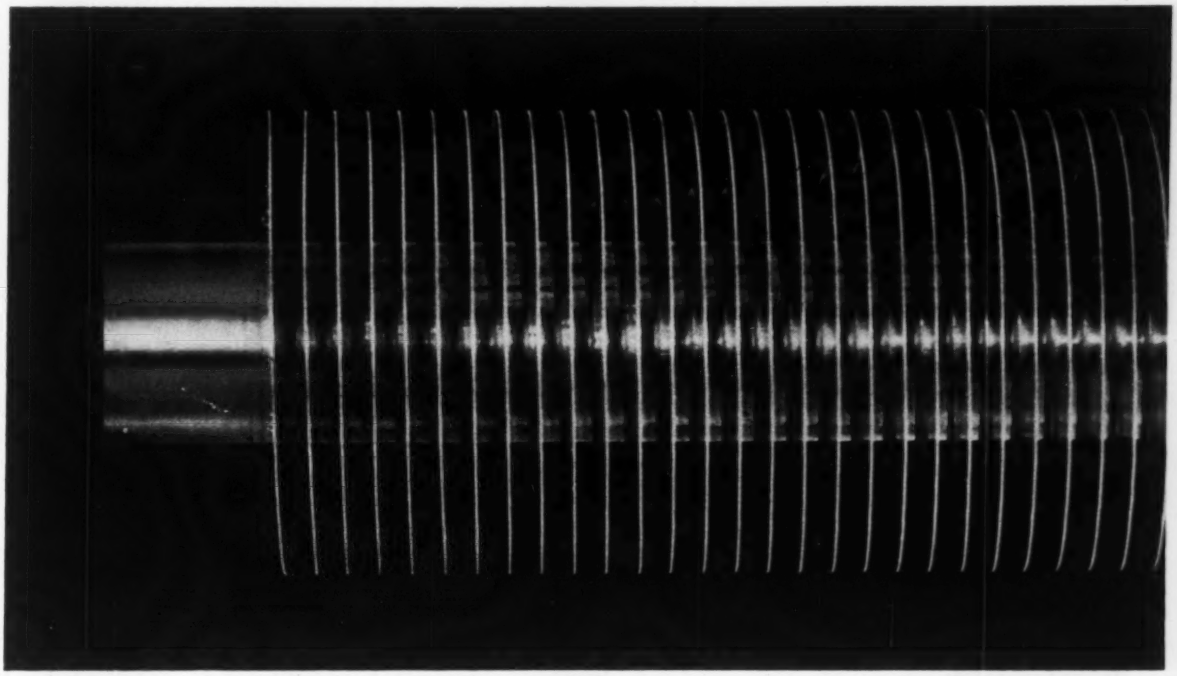
New nozzles machined from single solid bar, do not require internal pin or spreader, company says. More than 100 sizes, types available.



Exhaust Fans . . .

. . . in 18, 24, 34, 42 in. diameters— *Binks Mfg. Co., Dept. HPAC,* 3122 *Carroll Ave., Chicago* 12.

New units designed to furnish static pressure $\frac{1}{4}$ to $1\frac{1}{4}$ in. Volume of air moved ranges to 28,375 cfm. Aluminum fan blades driven by v-belts passing through dust tight housing, manufacturer says.



AEROFIN

Smooth-Fin Coils offer you

Greater Heat Transfer

per sq. ft. of face area

Lower Airway Resistance

—less power per c.f.m.

Aerofin smooth fins can be spaced as closely as 14 per inch with low air friction. Consequently, the heat-exchange capacity per square foot of face area is extremely high, and the use of high air velocities entirely practical. Tapered fin construction provides ample tube-contact surface so that the entire fin becomes effective transfer surface. Standardized encased units arranged for simple, quick, economical installation.

Greater Capacity
Less Air Resistance
with AEROFIN
Heating and Cooling Coils

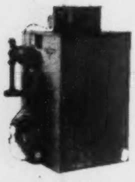
Write for Bulletin S-55

AEROFIN CORPORATION

101 Greenway Ave., Syracuse 3, N. Y.

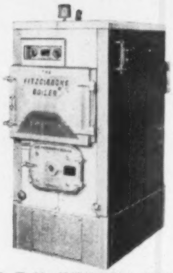
Aerofin is sold only by manufacturers of fan system apparatus.
List on request.

The Whole Range of
HEATING
NEEDS

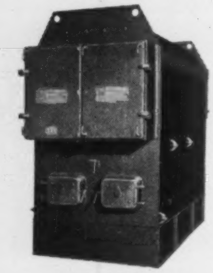


7700 SERIES UNITS
OIL OR GAS FIRED
for smaller homes.

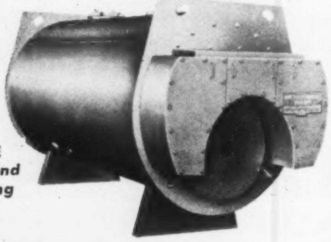
"400" SERIES
for moderate
to large homes



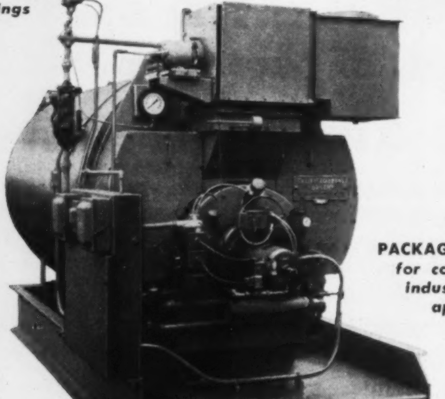
"R-Z-U JUNIOR" SERIES®
for small schools,
apartments,
commercial buildings



"D" TYPE
for large schools
and buildings



"SCOTCH" TYPE
for commercial and
industrial heating
applications



PACKAGED BOILER UNIT
for commercial and
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applications

ABUNDANT HOT WATER, TOO

Fitzgibbons Tanksaver® with any of these units, supplies more hot water than any other method—instantly—summer and winter—without the cost of a tank.

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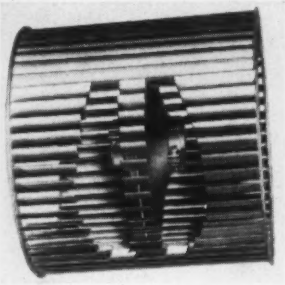
EQUIPMENT DEVELOPMENTS

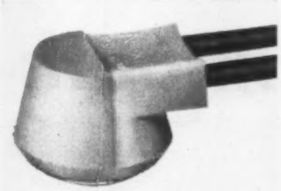
Continued



Blower Hub . . .

. . . for large bore application — *Lau Blower Co., Dept. HPAC, 2001 Home Ave., Dayton 7, Ohio.*

New design available on all blower wheels from 9 in. diameter to 30 in. diameter. Hub diameters are 2 to 4½ in. Each large hub section made from single sheet of metal extruded under die pressure. Two sections joined in each wheel to make complete hub; curved clamp draws hub tightly to shaft, manufacturer says.



Sealed Thermostat . . .

. . . designed to seal out moisture, dust in refrigeration and air conditioning units — *Spencer Thermostat Div., Metals & Controls Corp., Dept. HPAC, 34 Forest St., Attleboro, Mass.*

Control is disc type, single pole, single throw thermostat with automatic reset at fixed temperature settings. Various differentials, tolerances offered within temperature range −20 to 167 F. Rated at 25 amp noninductive, 120/240 vac for 100,000 cycles.

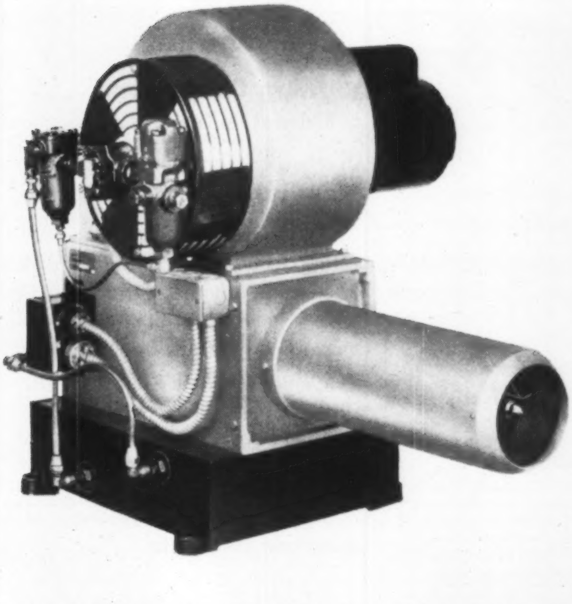
Air Cooled Condenser . . .

. . . in five models—*Larkin Coils, Inc., Dept. HPAC, 519 Memorial Dr., S. E., Atlanta 1.*

New "BFC Zephyrcon" units are belt driven, range 5 through 20 tons. Engineered for parallel use to ac-

HOWARD
JOHNSON'S
ICE CREAM
28 FLAVORS
GRILLE
FRIED CLAMS

TYPICAL SUN-RAY
#4-#5 OIL BURNER INSTALLATION



Get the facts. Get the Sun-Ray sales story.

HOWARD JOHNSON'S, Queens Blvd., New York City, another restaurant of the famous chain, installed a SUN-RAY #4-#5 Oil Burner.

Reports from this replacement installation: Cleaner, quieter operation. Servicing—practically nil. Fuel and operating costs—way down.

This experience is typical. It is being repeated in hundreds of commercial, industrial and institutional establishments throughout the world.

A sure way to satisfy customers and increase sales and profits is to install a SUN-RAY #4-#5 OIL BURNER.

INSTALL A SUN-RAY #4-#5 OIL BURNER

1—Easy to Install—Simple to Service.
2—Automatic, Trouble-free Operation.
3—Burns Low-Cost, Higher BTU #5 and #4 Oil.
4—Clean—Quiet—Very High Efficiency.
5—All Electric Ignition—No Gas Pilots.
6—Will Also Burn #2 Oil.
7—No Transfer Pump Required on Normal Jobs.
8—Approved for #5 and #4 Oil by U L and Other Authorities.

SUN-RAY BURNER MANUFACTURING CORPORATION

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"Note the True Ball Joint ...that's a DART Exclusive"

Yes, Dart Unions fit tighter and last longer because their two bronze seats are precision ground to a true ball joint. You get a drop-tight connection without straining arm, wrench or union. What's more, a Dart uncouples just as easily. Ask your supplier.

QUICK FACTS

- Extra wide bronze seats resist pitting and corrosion.
- Nut and body of air-refined, high test malleable iron are practically unbreakable
- Heavy shoulders can withstand the toughest wrench abuse
- Each Dart is individually vacuum-tested

DART UNIONS *Products of* **DART UNION COMPANY** PROVIDENCE 5, R.I.

GENERAL SALES AGENT

THE **Fairbanks** COMPANY
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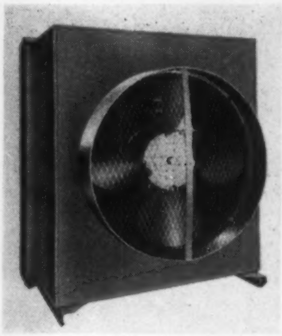
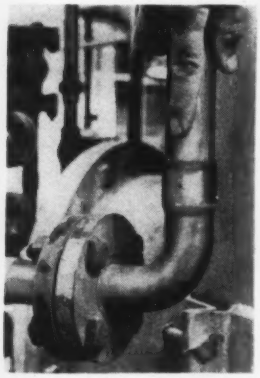


commodate air conditioning systems of any capacity, manufacturer says. Multiple circuits available for all models.



Aligning Connector . . .

. . . designed to weld stainless steel piping quickly—*Speedline Div., Horace T. Potts Co., Dept. HPAC, 504 Erie Ave., Philadelphia, Pa.*

New product fits over ends of connecting sections permitting in place pre-assembly of pipe, fittings. Icicles inside connections are eliminated, company says. Units engineered for use with lightwall stainless steel pipe, schedules "5" and "10"; "Speedline" fittings; conventional schedule "40" systems.

Equipment Briefs . . .

AIR CONDITIONERS in 11 new models—*Gibson Refrigerator Co., Div. of Hupp Corp., Dept. HPAC, Greenville, Mich.* "Trimline" units offered in capacities 1, $1\frac{1}{2}$, 2 hp in three series. In addition, five reverse

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It identifies dependable Air Moving Equipment

In months to come, you'll begin to see this symbol on most leading makes of air moving equipment. It will provide you with a means of identifying air moving equipment which will perform according to its published rating.

Use of the symbol is the outcome of a joint Canadian and U. S. cooperative program sponsored by the Air Moving and Conditioning Association to protect you from incorrect or improper performance ratings for such equipment.

Practically all leading manufacturers of air moving equipment are planning to qualify their standard products in tests made in accordance with the AMCA Standard Test Code and in laboratories inspected and approved by AMCA.

Each qualifying company will operate under a license agreement with AMCA basically requiring the following:

1. *The manufacturer's laboratory must be approved by AMCA.*
2. *Qualifying equipment must be tested in accordance with the AMCA Standard Test Code and published ratings must be in accordance with such tests.*
3. *The manufacturer must maintain manufacturing control of the products involved so that the equipment will perform in accordance with published ratings.*

A public announcement soon will let you know when you may specify "according to AMCA Certified Rating." Until then, let us send you advance information on this program. If you specify equipment, write for Bulletin 153-57. If you are an equipment user, ask for Bulletin 152-57.

CERTIFIED RATINGS

Certified Ratings are the result of tests made by the manufacturer in accordance with Standard Test Codes adopted by the Air Moving and Conditioning Association, Inc. Air Moving and Conditioning Association, Inc., is successor to Industrial Unit Heater Association, National Association of Fan Manufacturers, Inc., and Power Fan Manufacturers Association.

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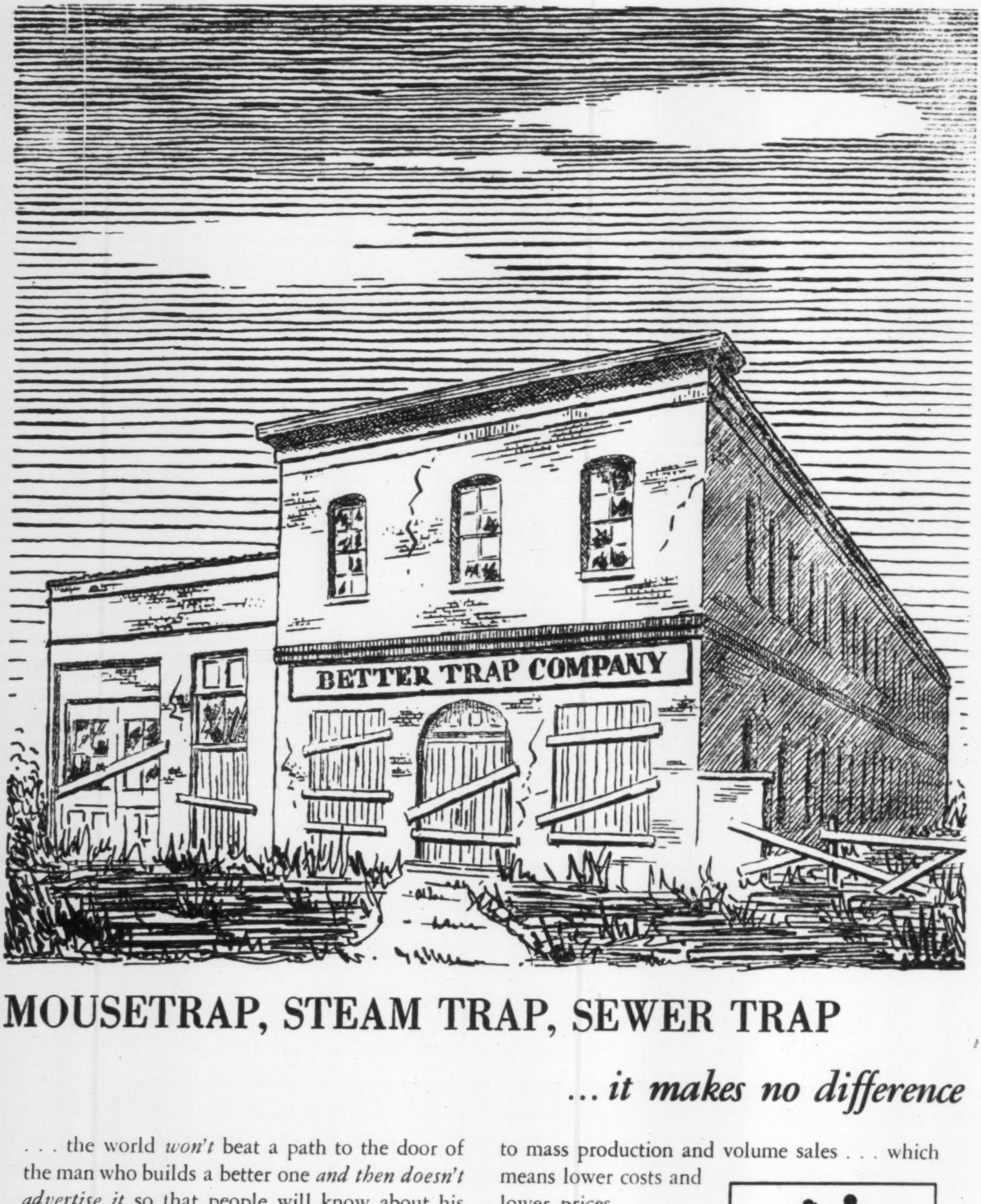


MOUSETRAP, STEAM TRAP, SEWER TRAP

...it makes no difference

. . . the world *won't* beat a path to the door of the man who builds a better one *and then doesn't advertise it* so that people will know about his product, know where it can be bought and how much it costs.

Advertising benefits the buyer, too. It tells you the product story, makes it easy for you to buy. Even more important to you, advertising leads to mass production and volume sales . . . which means lower costs and lower prices.

Yes, "Advertising Benefits You" . . . 'specially business-paper advertising.

YES ADVERTISING BENEFITS YOU!

EQUIPMENT DEVELOPMENTS

Continued

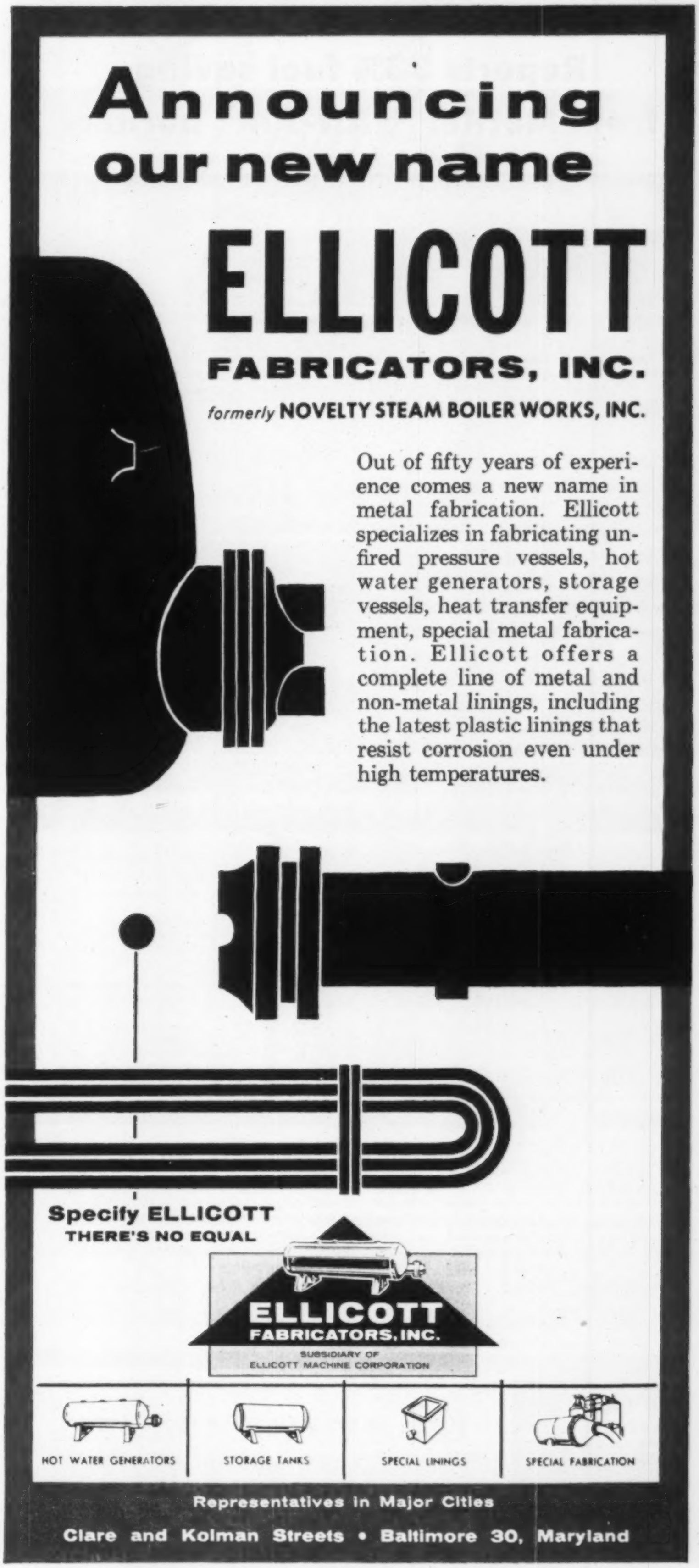
cycle models available as heat pumps. Features of new product line cited include door panel dehumidification booster, "All Sweep" automatic directional cooling, permanent electrostatic filters.

WIRE STRAPPER featuring thumb operated gage—*Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Dept. HPAC,* 2209 *Santa Fe Ave., Los Angeles.* Unit strips all commonly used insulated wire 14 to 24 gage without nicking or cutting; specially hardened edges cut easily, manufacturer says. Size is 5 in.

MACHINE HEAD designed for heavy production applications of automatic machine welding—*Air Reduction Sales Co., Div. of Air Reduction Co., Inc., Dept. HPAC,* 150 *E. 42nd St., New York* 17. Aluminum wires 3/64 to ⅛ in., hard wires from 0.045 to ⅛ in. can be fed at any rate to 600 in. per min, company says. Wire feed speed adjustable by calibrated governor which regulates 1/3 hp wire drive motor. Machine barrel rated 600 amp on 100 percent duty cycle.

PANEL-VECTORS designed for hot water, steam heating — *Way-Wolff Associates, Inc., Dept. HPAC,* 33 *Fulton St., New York* 38. Unit—in addition to supplying heat by convection to living quarters in ships—gives some radiation. It offers little resistance to steam or water flow, has pleasing appearance, may be used for other space saving applications, company says.

SIGNS in self-adhering material—*Westline Products Div., Western Lithograph Co., Dept. HPAC,* 680 *E. 2nd St., Los Angeles* 54. Each sign may be applied instantly to metal, wood, tile, glass, cement, etc., after backing material is removed, manufacturer says. No gumming, nailing, drilling, screws, required. Signs can be combined to read as one sign or by themselves. ‡



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Out of fifty years of experience comes a new name in metal fabrication. Ellicott specializes in fabricating unfired pressure vessels, hot water generators, storage vessels, heat transfer equipment, special metal fabrication. Ellicott offers a complete line of metal and non-metal linings, including the latest plastic linings that resist corrosion even under high temperatures.

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SPECIAL FABRICATION

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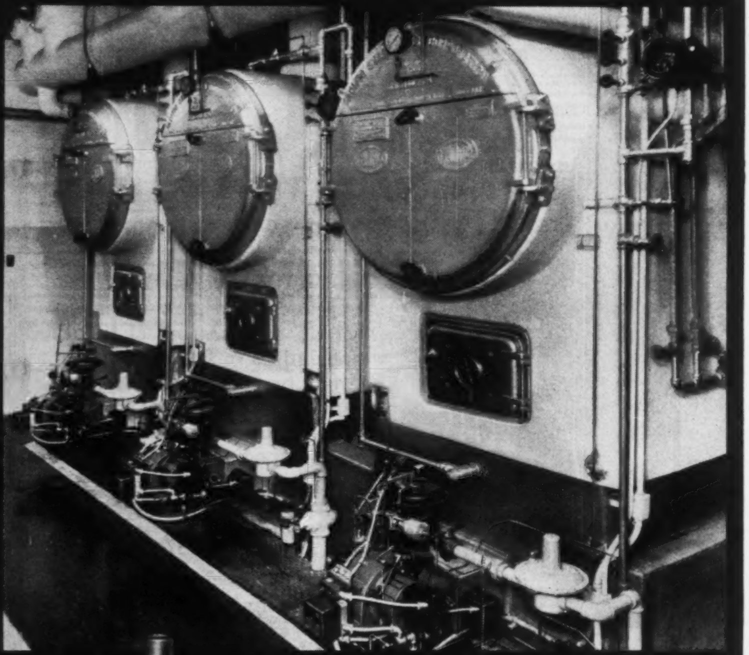
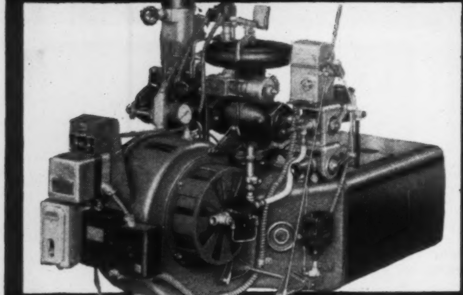
Reports 33% fuel saving from Mettler "FAN-AIR" burners





Why consulting engineers specify Mettler Burners

Change fuels easily, with remote, manual, or automatic control . . . lifetime integrated multi-port combustion tile provides complete, efficient fuel burning . . . exchange of gas orifices gives wide capacity range . . . exclusive pilot rectification control system assures safer combustion . . . give flexible operation with mechanical or natural draft.

Conversion of three boilers using "FAN-AIR" Dual Fuel Burners produced a sizeable three-way saving! In addition to 33% reduction in gas consumption, boiler maintenance has been reduced greatly because complete combustion keeps the fire-tubes clean. The boiler room is cleaner, too, and firebrick spalling and cracking has been eliminated. Modulating fuel control minimizes temperature fluctuations and adds years of life to the furnaces. These are results you can expect from "FAN-AIR" Dual Fuel Burners . . . results that win customers and influence sales *for you.* Range of sizes from 25 to 500 horsepower, for any grade of gas or oil fuel. • Write for specifications and descriptive Bulletin No. 12-S.

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Eclipse

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Division of ECLIPSE FUEL ENGINEERING CO.
4366 Worth Street, Los Angeles 63, Cal.

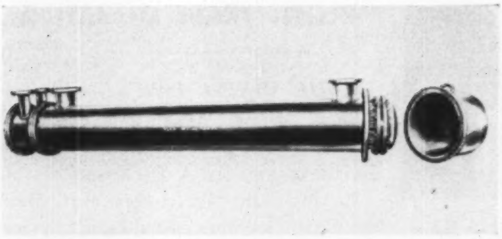
RECENT TRADE LITERATURE . . .

▶ *AIR COMPRESSOR LUBRICANT* — New booklet describes air compressor lubricant said to provide safety from flash fires, explosions. "Pydraul AC" reduces carbon deposits on exhaust valves, in interstage equipment, company says. Auto ignition temperature of fluid more than 1100 F. *Organic Chemicals Div., Monsanto Chemical Co., Dept. HPAC,* 800 *N.* 12*th Blvd., St. Louis.*

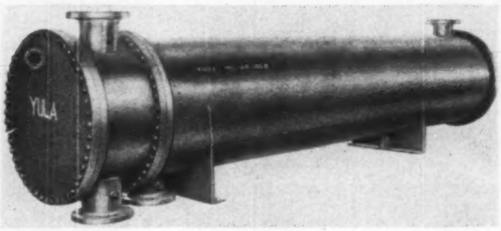
▶ *AIR CONDITIONERS* — New 16 page bulletin 8827 describes inductor air conditioners for permimeter air conditioning of multi-story buildings. Installation, adjustment, control information provided. Primary air rating curves, heating and cooling capacity indices, coil water friction values, pressure drop curves included. Tables show basic unit ratings, gravity heating capacities. *American-Standard, American Blower Div., Dept. HPAC, Detroit* 32.

▶ *AIR CONDITIONERS*—Three types of air conditioners in 13 models covered in leaflet CR-5715R. Features cited: simple piping connections, quiet operation, three position wall switch. Recommended by company for hotels, apartments, motels. *Drayer-Hanson, Div. of National-U. S. Radiator Corp., Dept. HPAC,* 3301 *Medford St., Los Angeles* 63.

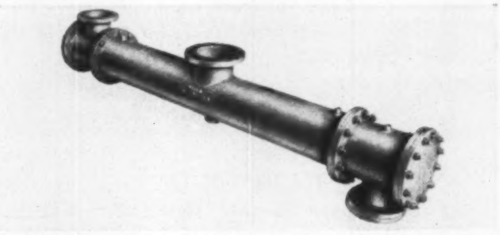
▶ *AIR CONDITIONERS* — New 4 page brochure describes remote packaged air conditioners for industrial applications. Three sizes, 15, 20, 25 tons, discussed. Fan motor may be mounted on front or back at either end; fans can be mounted with top, front, or rear discharge for vertical arrangement of unit and forward, upward, or downward for horizontal arrangement, company says. Illustrations provided. *Worthington Corp., Dept. HPAC, Harrison & Worthington Sts., Harrison, N. J.*



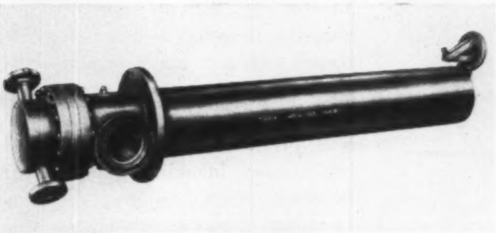
Full Floating Head Exchanger.



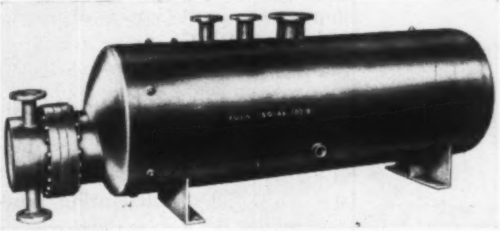
Channel Type Interchanger — for water-to-water application in Air Conditioning.



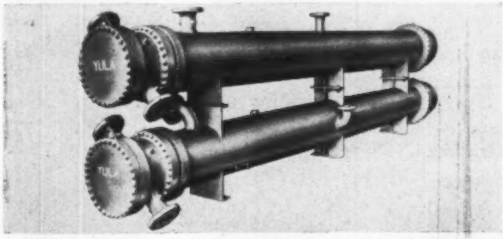
Straight Tube Channel Type Convertor — for Heating, Zone Systems, Snow Melting where either steam or water is the heating medium.



Oil Tank Suction Heater with Check Valve.



Unfired High Temperature Hot Water Steam Generator.



High Pressure Floating Head Oil Heaters — for Power Plant Application.

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a complete line of heat transfer equipment for every application

Our organization is experienced in the design and fabrication of heat exchangers for commercial, process, chemical, refinery and marine requirements. In addition, we have made a specialty of the application of High Temperature Hot Water as a heating medium through the use of transfer equipment. We are still old fashioned in one respect; that a satisfied customer is valuable. Because of this belief, we offer; quality, fine workmanship, excellent service, free eningeering consultation and fair prices. Our shop is A.S.M.E. certified for materials commonly used in fabrication.

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Mec-Tric Control Co.—P. O. Box 209, Charlotte 1, N. C.
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Ralph Simmons Co.—73 La Salle Ave., Kenmore 17, N. Y.
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Power Specialty Co.—463 Chestnut St., Nashville 10, Tenn.
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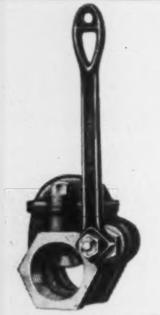
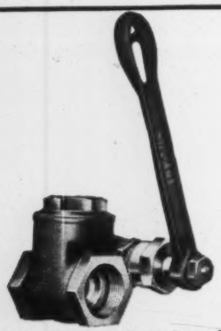
Source	**DETROIT CONTROLS**
Brand	**D.T. Williams**
Type	Lever Handle Gate Valves—all top quality. For full information write for Catalog 800.
Specifications	Meet all government, marine and industrial specifications.

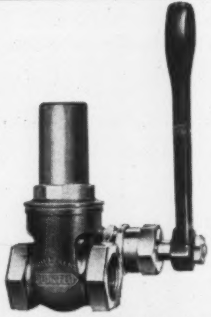


No. 130 Quick and full straightway opening and closing with short movement of lever. For steam pressures to 100 lbs. and air or liquids to 150 lbs., up to 500° F. Medium bronze construction, with malleable iron lever handle.

No. 131 Short movement of lever gives quick and full straightway opening. For steam pressures to 200 lbs., and air or liquids to 300 lbs., up to 500° F. Heavy bronze construction. Lever handle of malleable iron.



No. 736 "Quik-flo" Valve. Heavy bronze construction and suitable for wide application. For hazardous liquids; listed by Underwriters' Laboratories, approved by Factory Mutual. Steam pressures to 125 lbs. and air or liquids to 200 lbs., up to 450° F. Malleable iron handle.



No. 835 "Quik-flo" Valve. Self-closing and of heavy bronze construction. Designed for controlling hazardous liquids; approved by Factory Mutual. For steam pressures to 125 lbs., and air or liquids to 200 lbs., up to 450° F. Lever handle of malleable iron.

Quality Protects Your Investment--

American-Standard Quality Is Available At No Extra Cost.

Bridgeport 1,
Connecticut

DETROIT CONTROLS

Division of American-Standard

RECENT TRADE LITERATURE

Continued

▶ *AIR MIXING UNITS* — Illustrations, details, dimensions of "Dual Duct" air mixing units carried in new booklet DD-4. Each unit has air mixing valve, valve operator, individual volume regulation device. Valve operator pneumatically controlled by compressed air at 15 psi. *Buensod-Stacey, Inc., Dept. HPAC, 45 W. 18th St., New York* 11.

▶ *ALLOY SEAMLESS TUBING* — Technical data on alloy seamless tubing furnished in sales letter 290. Information supplied on high temperature strength properties of tubing. Data includes results of short time tensile, creep rupture tests made at temperatures to 1500 F. *Babcock & Wilcox Co., Tubular Products Div., Dept. HPAC, Beaver Falls, Pa.*

▶ *ALUMINUM SHEET* — New 28 page booklet describes aluminum sheet used in refrigeration, air conditioning, general construction fields. Typical applications cited include awnings, louvers, ventilators, baseboard radiator fins, freezing compartments, condensers, evaporators. Suggested uses of aluminum sheet alloys presented. Workability, shearing, slitting, blanking, piercing, perforation, sawing, routing, bending, spinning, drawing, stretch forming, roll forming, joining information supplied. *Revere Copper & Brass, Inc., Dept. HPAC,* 230 *Park Ave., New York* 17.

▶ *BELLOWS* — Stainless steel bellows described in 4 page booklet. New hydraulic manufacturing process provides more individual control over depth and spacing of convolutions without aid or need of stress relief annealing, company says. Specifications, engineering information information included. *Flexible Metal Hose Mfg. Co., Dept. HPAC,* 777 *W.* 16*th St., Costa Mesa, Calif.*

▶ *CAST STEEL GATE VALVES* — New 4 page booklet describes 150,

Worldwide installations

LILIE-HOFFMANN

...The dominant name in Cooling Towers since 1898...

Incorporating Every Advanced Engineering Refinement! Cooling Towers to Meet All Range, Capacity, and Size Requirements.

①

②

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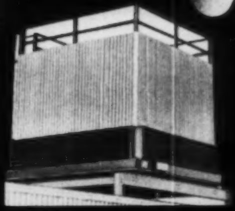
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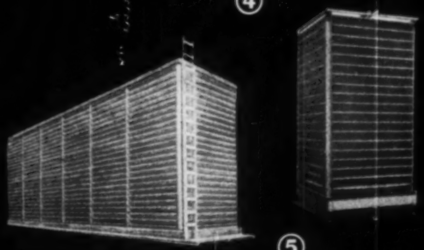
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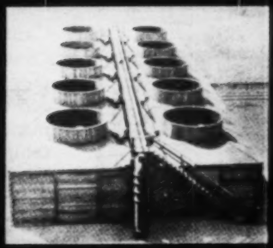
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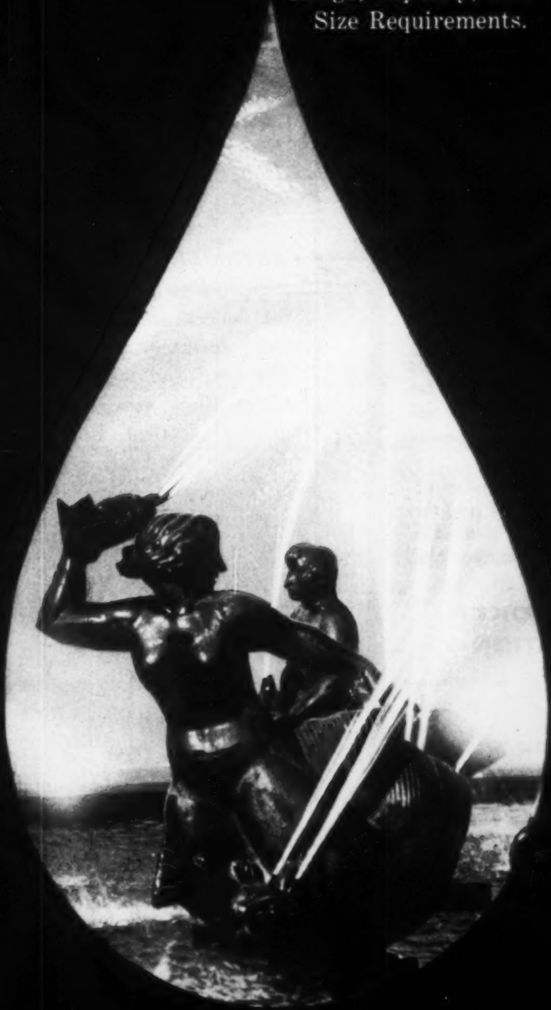

① **HORIZONTAL DRAFT TOWERS**
Package Type—4 to 100 Ton Installations.
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② **WATER-MASTER COOLING TOWERS**
Steel Packaged Units — 3 to 60 Ton Installations.
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③ **CROSS FLOW TOWERS**
Low Height — for Intermediate Installations.
Bulletin HCM-456

④ **COUNTER FLOW TOWERS**
Space Saving — for Intermediate Installations.
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⑤ **ATMOSPHERIC SPRAY TOWERS**
Smaller CS Series — to 50 Ton Installations.
Larger S Series for Heavy Duty Industrial Applications.
Bulletins HCS and HS

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For Heavy Duty, Large Installations.
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RECENT TRADE LITERATURE

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300 lb cast steel gate valves. Dimension, weight charts, line drawings for each type supplied. Deep stuffing boxes in all sizes, pressures; gland eye bolts; cylindrical, bottom seated rings with ample cross section; body to bonnet joints for re-assembly of valves in the field among features highlighted. *Walworth Co., Dept. HPAC, 60 E. 42nd St., New York.*

▶ *CENTRIFUGAL FANS* — New 32 page catalog 257 gives engineering data on "BC Airfoil" centrifugal fans. Illustrations show construction details of units for various types of ventilating, air conditioning installations. Capacity tables, dimensional drawings, suggested application arrangements given for each model. Rating tables on motors, sample fan specifications, laws of fan performance provided. *Ilg Electric Ventilating Co., Dept. HPAC,* 2850 *N. Pulaski Rd., Chicago* 41.

▶ *CENTRIFUGAL FANS* — New 12 page booklet 1121 describes series "8000" centrifugal fans with airfoil blading covering requirements to 700,000 cfm and to 16¾ in. total pressures. Block dimensions, fan arrangements detailed. Units may be applied to industrial, general purpose, commercial, heavy duty fields. New blading offers quieter operation, according to manufacturer. *Westinghouse Electric Corp., Sturtevant Div., Dept. HPAC,* 200 *Readville St., Hyde Park, Boston* 38.

▶ *CENTRIFUGAL PUMPS* — Two 4 page bulletins, 1400 and 1410, describe type "U-M" horizontal and type "U-VM" vertical "Non-Clog" pumps designed for pumping heavy liquids and liquids containing solids, foreign matter. Information supplied on casings, impellers, suction cover rings, shafts, sleeves, boxes. Sectional views, dimensions provided. *Weinman Pump Mfg. Co., Dept. HPAC,* 290 *Spruce St., Columbus* 8, *Ohio.*

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From its beginnings this nation has been guided by great ideas.

The men who hammered out the Constitution and the Bill of Rights were thinkers—men of vision—the best educated men of their day. And every major advance in our civilization since that time has come from minds *equipped by education* to create great ideas and put them into action.

So, at the very core of our progress is the college classroom. It is there that the imagination of young men and women gains the intellectual discipline that turns it to useful thinking. It is there that the great ideas of the future will be born.

That is why the present tasks of our colleges and universities are of vital concern to *every* American. These institutions are doing their utmost to raise their teaching standards, to meet the steadily rising pressure for enrollment, and provide the healthy educational climate in which great ideas may flourish.

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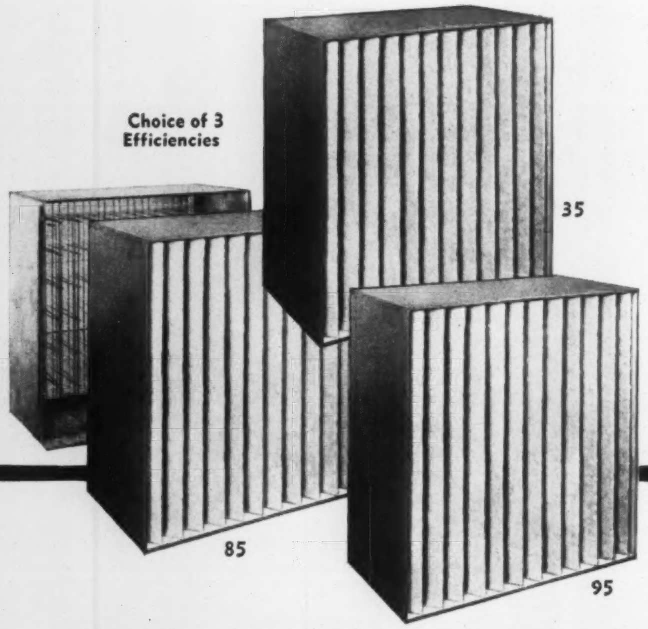

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...Your Safeguard against Changes in Supply Air... or Process Requirements

Even if you know the exact amount of each type of dirt in the supply air, you have no assurance that it won't change next month or next year.

Even if you know exactly how clean the air must be for your comfort conditioning or process, you can't be sure what the future requirements will be.

With other air-cleaning systems, any necessary change in efficiency can be very costly. But with Cambridge AEROSOLVE Filters, it is simply a matter of substituting filter cartridges of higher or lower efficiency as required. No further changes in the filter system are necessary.

Or you might find that inexpensive pre-filters, which can be added at any time, will be economically advantageous.

High Efficiency at Low Cost

The annual owning and operating cost of Cambridge AEROSOLVE Filters is only a fraction of the cost of other high-efficiency filtration equipment, so that practical consideration can now be given to high efficiency on all process and comfort conditioning jobs.

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Cambridge Filter Corporation
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Also Makers of the Famous ABSOLUTE® Filter— World's Most Efficient Air Cleaning Device

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RECENT TRADE LITERATURE

Continued

▶ *CHANNEL PIPE* — New 4 page bulletin describes installation features, specifications of "Chemi-Drain" channel pipe. It is a chemically inert vitrified clay product for handling, disposing highly corrosive fluid industrial wastes, company says. Walls of pipe scored for separation at drain depths 4 to 12 in. Matching tile curbing designed to add 8 in. to drain depth. *Logan Clay Products Co., Dept. HPAC, Box 698, Logan, Ohio.*

▶ *CLAY PIPE* — New 2 page bulletin describes clay pipe. Methods for handling, storing, installing product with precast factory made bituminous joints given with suggestions on preparing trenches. Illustrations provided. *Clay Sewer Pipe Association, Inc., Dept. HPAC,* 311 *High-Long Bldg.,* 5 *E. Long St., Columbus* 15, *Ohio.*

▶ *CLEANING EQUIPMENT* — Equipment for cleaning boilers and air conditioners described in new 4 page booklet. Two vacuum machines, "Master-Vac" and "Spic-Span," discussed. Illustrations, specifications of both units provided. *Premier Co., Dept. HPAC,* 755 *Woodlawn Ave., St. Paul* 16.

▶ *COOLING TOWERS* — New 6 page bulletin describes "Tru-Air" cooling towers for indoor, outdoor use with capacities 10 to 200 tons. Units available with centrifugal, axial flow fans, in cement-asbestos casings with stainless steel wetted deck surface. Construction, safety, maintenance features of units highlighted. *M. Blazer & Son, Dept. HPAC,* 173 *Market St., Passaic, N. J.*

▶ *DUCT INSULATION* — Engineering data, application instructions for spun mineral wool duct insulation presented in new 4 page bulletin. Product designed for application to heating, air conditioning ducts to 450 F. Thermal conductivities, sound

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Mouse and man, worm and wasp, pig and protozoa — these are some of the twenty-eight living things used in the American Cancer Society's nation-wide research program.

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Many organisms. Many laboratories. Many hundreds of scientists. Together they make up a balanced program of research with freedom and flexibility, reaching across the country and across scientific disciplines, to tap the best minds and the best ideas.

From these twenty-eight organisms science is getting facts that may save more lives tomorrow. But what of today? What of you?

With early diagnosis, half of those with cancer can now be cured if treated promptly. If you have cancer, you may well be saved — but only if you give your doctor a chance. Go to him for an annual health checkup . . . not because you feel ill, but because you feel good and want to stay that way.

The worm and the wasp, the pig and the protozoa will provide the answers for tomorrow: for today, see your family doctor.

AMERICAN
CANCER
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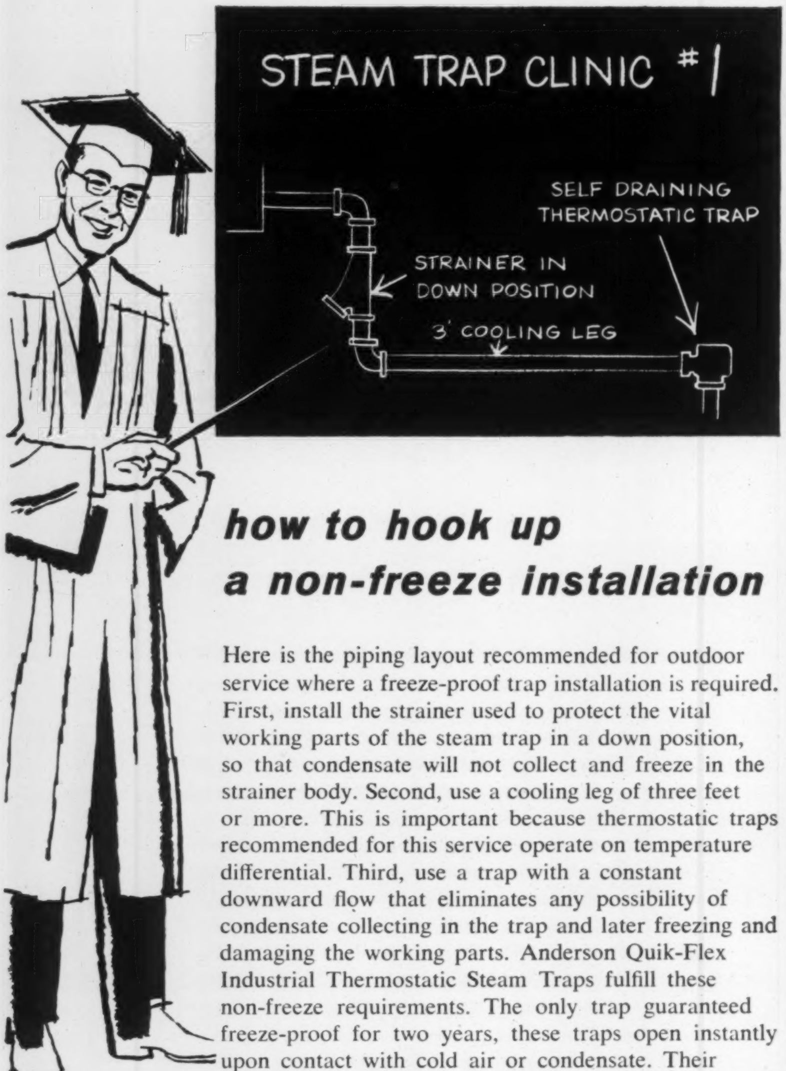

how to hook up a non-freeze installation

Here is the piping layout recommended for outdoor service where a freeze-proof trap installation is required. First, install the strainer used to protect the vital working parts of the steam trap in a down position, so that condensate will not collect and freeze in the strainer body. Second, use a cooling leg of three feet or more. This is important because thermostatic traps recommended for this service operate on temperature differential. Third, use a trap with a constant downward flow that eliminates any possibility of condensate collecting in the trap and later freezing and damaging the working parts. Anderson Quik-Flex Industrial Thermostatic Steam Traps fulfill these non-freeze requirements. The only trap guaranteed freeze-proof for two years, these traps open instantly upon contact with cold air or condensate. Their downflow type design keeps condensate flowing out of the trap so that it cannot freeze as it cools.
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RECENT TRADE LITERATURE

Continued

absorption coefficients given in tabular form. Physical, chemical, mechanical, handling properties described. *Baldwin-Hill Co., Dept. HPAC, 500 Breunig Ave., Trenton, N. J.*

▶ *DUCT, FITTINGS* — New booklet describes "Ceramiduct" vitrified clay heating duct material. Diagrams, descriptions of warm air underfloor heating duct installations for warm air perimeter systems presented. Data on straight ducts, curves, pipe reducers, perimeter reducting "T" and "Y" fittings, angle cut ducts, register boxes, baseboard diffuser boxes given. *Straitsville Brick Co., Dept. HPAC, New Straitsville, Ohio.*

▶ *EXPANDED METAL* — Uses of expanded metal for ventilation applications described in new 8 page bulletin 20-4. Sizes, air flow tables, load capacities of grating type provided with illustrations of four new patterns. Product supplied in carbon steel, stainless steel, aluminum in standard and flattened mesh. *Joseph T. Ryerson & Son, Inc., Dept. HPAC, Box 8000-A, Chicago 80.*

▶ *FAN TESTING* — New 4 page brochure entitled *Prototype Fan Testing and Computations for Testing Fan Equipment* tells how prototype fans are tested to obtain performance characteristics for complete series of fans of same or larger sizes. Definitions of test ratings, deviations from fan laws covered. *Air Moving and Conditioning Association, Inc., Dept. HPAC, 2159 Guardian Bldg., Detroit 26.*

▶ *FASTENERS* — New chart presents information on concrete fasteners. "Red Head" units, sizes 1/4 to 7/8 in., in snap-off end, flush end, stud anchor, rod hanger, tie wire, clinch-nail types described. Each illustration measures full scale. Diagrams give instructions for installation by hand, impact hammer. *Phillips Drill*

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	WHICH PIPE SHOULD YOU USE . . .		WHERE . . . WHEN?
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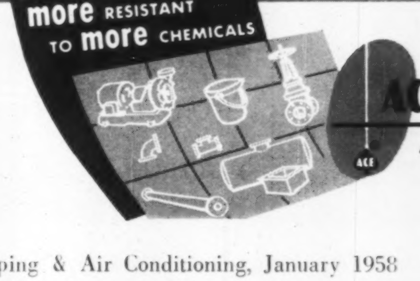
	ACE TEMPRON Threaded Pipe ¾" to 8" Fittings ¾" to 6" *Bulletin 96-A*	For hot corrosives to 260-275 deg. F. Rigidity and resistance better than previous nitriles.	Best anywhere for hot inorganic chemicals, acids. Also unusually wide variety of organics at room temp.
	RUBBER-LINED STEEL Flanged Pipe 1½" to 24" & up Fittings 1½" to 24" & up Valves ½" to 24" *Bulletin CE-52*	Strength and pressures of steel plus resistance of hard rubber. Soft rubber interlayer aids shock resistance.	Finest resistance to alkalis, most inorganic acids, many organic acids, all salts. Ideal for bleaches.
	ACE SARAN Threaded Pipe ½" to 6" Tubing ⅛" to ¾" Fittings ⅛" to 2" Valves ½" to 2" *Bulletin CE-58*	Odorless, tasteless, general-purpose rigid pipe and semi-flexible tubing. High pressures.	Excellent . . . not affected by most inorganic acids and alkalis. High resistance to most organics.
	ACE HARD RUBBER Pipe ¼" to 8" Flanged Fittings 1½" to 8" Threaded Fittings ¼" to 8" Many Valve Types ⅛" to 5" *Bulletin CE-51*	The oldest, still tops. Widest range of fittings of any rigid non-metallic pipe.	Extreme resistance to alkalis, most inorganic acids, many organic acids, all salts. Ideal for chlorine, fluorine.
	ACE PARIAN Threaded Pipe ½" to 2" *Bulletin 351*	Odorless, tasteless, rigid polyethylene. Not strongest plastic, but best for sub-zero uses.	Best resistance of any plastic at room temp. except to acetic acid. Good for alkalis, acids, many organics.
	ACE-FLEX Flexible Tubing 0.120" to 1" I.D. *Bulletin 66*	General-purpose transparent flexible tubing. Non-toxic, odorless, tasteless. Can steam-sterilize.	Very good resistance to most inorganic acids and alkalis. Resists many organics at room temperature.



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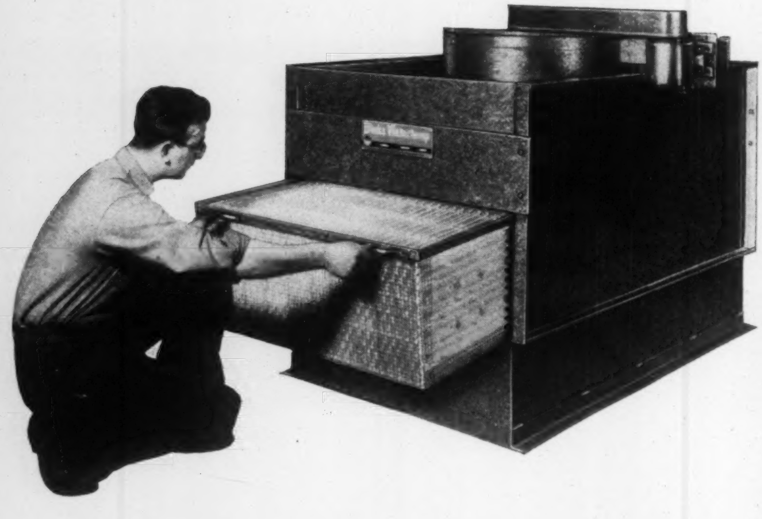

Puts big cooling tower features in small package

Binks' new Watertemp

Small, compact, economical in cost, operation and maintenance—Binks Watertemp cooling towers are ideal for air conditioning installations in the 5 to 60 ton range. Base dimensions for the largest unit are only 7'6" x 12' and maximum over-all effective height is 5'.

Efficient counter-current water and air flow. A dynamic and static balanced fan mounted at the top of the tower draws air up through the decking. Water is brought in at the tower top under low head and flows down over the multi-finned plastic decking. No nozzles are required to effect initial water break-up.

Heavily galvanized after assembly. Metal framework, panels and all attachments are heavily galvanized after assembly. Special hot-dipped galvanizing deposits a 20% heavier thickness than established as standard by Federal and A.S.T.M. specifications. No additional painting or coating is required.

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Send for complete data. Ask your Binks Branch Office, or write direct for the new Watertemp Bulletin. For larger induced and forced draft cooling towers, ask for Bulletin 477-A (Binks 3-B series) and Bulletin 333 (Binks 2-K series). Binks engineers will be glad to answer your questions and help solve your particular cooling problems. There is no obligation.

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RECENT TRADE LITERATURE

Continued

Co., Dept. HPAC, U.S. No. 12 and Liberty Trail, Michigan City, Ind.

▶ *GAS WATER HEATERS* — New catalog describes commercial gas water heaters. Seventeen models shown with construction specifications. Control, hot water delivery, space requirement data supplied. "Equal-Flow" manifold assemblies for multiple unit installation of "Sanimaster" gas water heaters also discussed. *Ruud Mfg. Co., Dept. HPAC, Kalamazoo, Mich.*

▶ *HEATING, AIR CONDITIONING EQUIPMENT* — New 28 page brochure SC-180 entitled *The Surface Story* describes activities of company. Brief descriptions of equipment provided. *Surface Combustion Corp., Dept. HPAC,* 2375 *Dorr St., Toledo.*

▶ *LEVEL, FLOW CONTROLS* — New 10 page booklet entitled *The Power Plant of Tomorrow* describes use of "Magnetrol" liquid level, flow controls at experimental boiling water reactor of the Argonne National Laboratories in Lemont, Ill. Illustrations taken inside reactor and flow diagram explain function of each of 16 "Magnetrols" installed as safety controls. *Magnetrol, Inc., Dept. HPAC,* 2110 *S. Marshall Blvd., Chicago* 23.

▶ *MOTORS* — New 12 page booklet A-2400 entitled *Sky High to Ocean Blue* discusses drives, motors for industrial uses. Covered are integral a-c motors to 400 hp; d-c units to 1000 hp; d-c, a-c generators, motor generator sets; gearmotors, variable speed drive systems. Use of analog computers to determine acceptability of new drive designs described. *Reliance Electric & Engineering Co., Dept. HPAC,* 24701 *Euclid Ave., Cleveland* 17.

▶ *NOZZLES* — New 12 page brochure describes manufacturing proc-

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PULL HERE THIS END UP
VANE RUNNERS
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for installing single or double blade turning vanes in square elbows. No special tools required.

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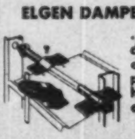

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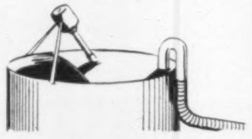
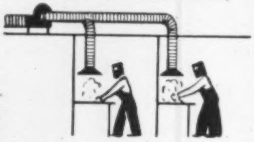
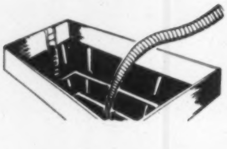

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Exceptionally easy to cut, install, connect, reuse, and relocate.
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RECENT TRADE LITERATURE

Continued

ess of "Oxweld" cutting nozzles. Features of units cited by company: self-aligning conical seats; seat protectors designed for long life; precision swaging that produces smooth internal passages. *Linde Co., Div. Union Carbide Corp., Dept. HPAC, 30 E. 42nd St., New York* 17.

▶ *OIL BATH AFTERCLEANER* — New "P-17 Cycoil" oil bath aftercleaner designed for collecting dust particles described in 8 page booklet 285-A. Engineering data, illustrations included. Unit is automatic, self-cleaning dust collector that separates dust from air as it passes through viscous crimped wire, fluid bed pad. Dust laden air mixed with oil by means of perforated plate over which oil flows from central distributing point. Upward flow provides holding force required to keep large quantity of oil in pad, company says. *American Air Filter Co., Inc., Dept. HPAC*, 215 *Central Ave., Louisville.*

▶ *OIL HEATERS* — New 4 page brochure lists features of weatherproof "Hi-Heat" oil heaters. Units applicable to industries where heating temperatures to 500 F are required and operation at low pressures is desirable, company says. Illustration shows internal construction of coil type furnace design. Specifications provided. *Bros, Inc., Dept. HPAC*, 1057 10*th Ave., S. E., Minneapolis* 14.

▶ *PIPE BENDERS* — Three types of bending machines described in new 38 page catalog. Highlighted are ram benders from "1400" to "700" series with capacities to 16 in. extra heavy pipe; rolling machines with automatic roll repositioning; rotary benders available in variety of styles, sizes. More than 30 illustrations provided. *Wallace Supplies Mfg. Co., Dept. HPAC*, 1300 *Diversey Pkwy., Chicago* 14.

▶ *PIPE INSULATION* — "Z-Crete" underground hot pipe insulation de-

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- **Residential Heat Pumps**
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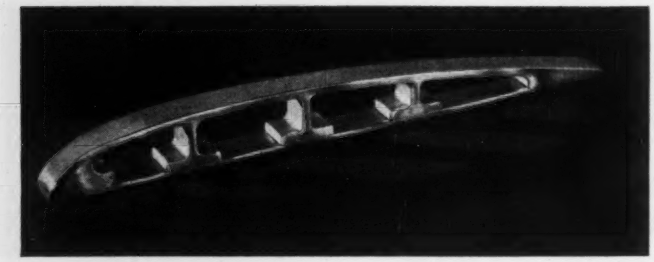

Cross section shows structural superiority of Aeromaster's new, extruded aluminum-alloy blades in diameters from 9' to 22'.

NEW! EXTRUDED ALUMINUM Blades on AEROMASTER* fans only

AEROMASTER'S new, extruded aluminum blades combine in one design the advantages of a light weight metal, a hollow structure and the superior strength of wrought metal . . . Silicon-magnesium aluminum alloys resist corrosion. Their fine grain structure, high tensile strength and increased endurance eliminate danger from wear, vibration, and metal fatigue . . . true airfoil blade sections assure maximum air delivery . . . adjustable blade pitch angle permits decrease of fan load to an accurate minimum horsepower requirement.

The AEROMASTER fan is easily assembled *in the tower.* No special handling equipment is necessary. AEROMASTER fans cost less to install, less to operate, less to maintain!

For more details write to KOPPERS COMPANY, INC., Aeromaster Fan Dept., 6801 Scott Street, Baltimore 3, Maryland.

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Aeromaster Fans

Engineered Products Sold with Service

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QUALITY in Double-Suction Split-Case Pumps

PRICED to meet all competition!

★ NOW . . . figure CARVER Split-Case Pumps in on any job . . . they offer quality and *proved performance* at a *price that is under or competitive* with all others!

★ NEW and IMPROVED, *with double-suction in all sizes,* these CARVER Pumps have all the desirable features of Split-case pumps. Line includes the popular 3500 RPM units.

★ Designed for either mechanical seals or packed stuffing boxes.

★ Capacities up to 3500 GPM. Heads up to 340 ft.

CARVER PUMP COMPANY
1460 Hershey Ave., Muscatine, Iowa

CARVER

Long established in the field CARVER Split-Case Pumps are performance-proved in every way!

Ask for Complete Information

RECENT TRADE LITERATURE

Continued

scribed in new 12 page booklet. Sequence illustrations, diagrams of "cast-in-place" monolithic conduit system provided. Features cited by manufacturer: efficient insulation, substantial structural pipe support, resistance to water penetration; high mechanical, load bearing capabilities. *Z-Crete Div., Zonolite Co., Dept. HPAC, 135 S. LaSalle St., Chicago 3.*

▶ *PIPE SEAL REPORT* — New 8 page brochure covers pressure, temperature, fluid, installation requirements of pipe filling users. Specifications for sealing devices in pipe circuitry also given. *Tru-Seal Div., Flick-Reedy Corp., Dept. HPAC, 2040 N. Hawthorne Ave., Melrose Park, Ill.*

▶ *PIPE, TUBING* — New data card 188 furnishes details of 33 seamless stainless grades of pipe, tubing. Information includes percentages of chemical properties together with type numbers, grades. *Babcock & Wilcox Co., Tubular Products Div., Dept. HPAC, Beaver Falls, Pa.*

▶ *PLASTIC GATE VALVE* — New 4 page booklet contains "Flex-Plug" plastic gate valve information. Unit combines no pressure drop construction of gate valve with flow control feature of globe valve, company says. Illustration shows resilient flexible cap designed to meet varied corrosive, slurry, vacuum services. Sizes range ½ to 2 in. *Vanton Pump & Equipment Corp., Dept. HPAC, 201 Sweetland Ave., Hillside, N. J.*

▶ *POLYETHYLENE PIPE* — New catalog describes uses of "Chesflex" virgin polyethylene pipe. Uses listed for product include: air conditioning, refrigeration, radiant heating, mine drainage, main water lines. Graphs, charts, engineering data included. *Chesflex Div., St. Regis Paper Co., Dept. HPAC, 684 Nepperhan Ave., Yonkers, N. Y.*

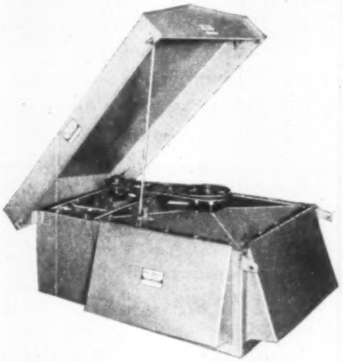
▶ *PROTECTIVE COATINGS* — Various protective coatings described in

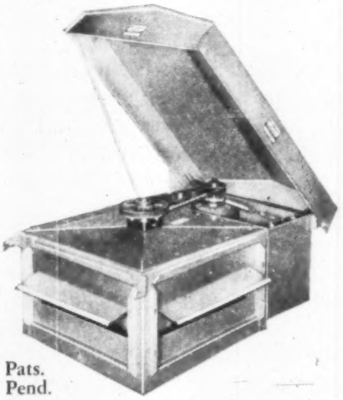
AirMpeler

LO-BOY

CENTRIFUGAL
ROOF EXHAUSTERS

Enchance The Beauty Of Building Skylines





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Pend.

Lowest Silhouette Design

Forward or Backward Curve Wheel Within . . . . or Out of Scroll Housing

Motor mounting on side of structure support . . . out of line of air stream reduces height of Lo-Boy models nearly 50% of older designs.

LOW WIND RESISTANCE
SIZES 10"-72" 600-47,000
CERTIFIED C.F.M. RATINGS

- QUALITY • BEAUTY
- PROVEN PERFORMANCE

See Sweet's File 20c/Amm or Write for bulletin HA-100 57

AMMERMAN CO., INC.

110 North Second St.
Minneapolis 1, Minnesota
MEMBER OF THE AIR MOVING & CONDITIONING ASSN.

RECENT TRADE LITERATURE

Continued

new bulletin ERW-TS3. Conditions given under which they supply required protection. Coatings discussed include pipe oil, slushing oil, emulsion oil, polar oil. *Babcock & Wilcox Co., Dept. HPAC, Beaver Falls, Pa.*

▶ *RADIANT BASEBOARD HEATING* — New bulletin has information on "Art Comfortline" baseboard. Dimensional, performance data provided with illustrations of decorator features. Actual setting in which product is pictured just as it would appear in any installation included. *National-U. S. Radiator Corp., Dept. HPAC, 944 Ash St., Johnstown, Pa.*

▶ *SPRAY NOZZLES* — New 32 page catalog 33 presents data on spray nozzles for industrial processing applications. Nozzles for evaporative condensers, cooling towers, spray drying, humidifying, other industrial uses illustrated, discussed. Rating tables, dimensions, weights, recommended uses, spray angles presented. *Delavan Mfg. Co., Dept. HPAC, 811 Fourth Ave., West Des Moines, Iowa.*

▶ *STACK, BREECHING DATA* — New 23 page report entitled *Report on Design Criteria for Stacks and Breechings* highlights methods of application, installation. Categories covered include definitions, basic principles, sizing, connections, height, stack caps, rain hoods, horizontal breeching, elbows, shape, material, insulation, draft, fixed barometric dampers. Line drawings, charts included. *Orr & Sembower, Inc., Dept. HPAC, Morgantown Rd., Reading, Pa.*

▶ *STAINLESS STEEL FASTENERS* — New 12 page booklet describes stainless steel "AN" fasteners. Bolts; slotted, machine screws; flat, round rivets; washers discussed. Illustrations, stock sizes, principal dimensions, explanations of part and dash numbers included. *Allmetal Screw Products Co., Inc., Dept. HPAC, 821 Stewart Ave., Garden City, L. I., New York.*

TAKE THE GUESSWORK OUT OF ESTIMATING

High Velocity Air Movement Systems

IN ONE COMPLETE PACKAGE

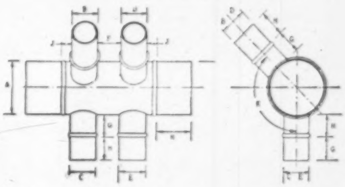
1 SPIRAL *Lockseam* PIPE

Spiral pipe, matched fittings and sound absorbers . . . all custom made to cut costs . . . quicken and pin-point estimates. Next time, specify United's spiral pipe fittings and sound absorbers . . . all in one complete package.

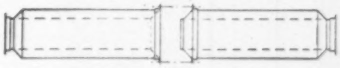
Spiral Pipe Standards and Sizes

• 26 gage zinc-coated steel — diameters 3" through 8" • 24 gage steel—9" through 22" • Standard length 12'—lengths to 20' if required • Available in any specified metal 20 to 30 gage

2 MATCHED FITTINGS
AVAILABLE FOR EVERY SPIRAL PIPE DIAMETER



3 SOUND ABSORBERS
HIGH PRESSURE
LOW FRICTION LOSS



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Showing Detailed Specifications and Applications

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Sheet Metal Co.

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Telephone: BElmont 5-3495

How to stop noise, vibration and "hammer" in water lines

THE ORIGINAL SOUNDZORBER expressly designed for use in air conditioning water lines . . .

SOUNDZORBER

A wire-reinforced wrapped fabric rubber pipe, SOUNDZORBER can be used continuously in water lines at up to 250 psi working pressure (safety factor: 5 to 1).

SOUNDZORBER

Smaller sizes ½" to 3" available with male I.P.T. bronze fittings. Larger sizes available with integral full-faced rubber flanges backed up with Series 15 or Series 30 steel flanges. No metal-to-metal contact.

SOUNDZORBER

SOUNDZORBER is but one of a complete line of Finn vibration controls. Finn has control devices for every vibration problem in your field. Write for complete information.

FINN
INDUSTRIAL DIVISION
VIBRATION FINNFLEX CONTROL

T. R. FINN & COMPANY, INC.
200 Central Ave., Hawthorne, N. J.

RECENT TRADE LITERATURE

Continued

▶ *STEAM HEATING COILS* — New 12 page booklet 1715 gives selection data, suggested piping arrangement of wrought iron heating coils. Performance tables, eight piping diagrams provided. Smooth tapered steel fins, spirally wound on external heater pipes and solder coated, give extended surface for unrestricted and efficient heat flow, company says. Internal distributing pipes designed to supply even steam distribution throughout coil. Available in 4 coil widths, 17 tube lengths. *Westinghouse Electric Corp., Sturtevant Div., Dept. HPAC, 200 Readville St., Hyde Park, Boston 36.*

▶ *STEEL TUBING* — New 4 page brochure discusses "Smoothweld" steel tubing designed for piping systems. Each length of tubing furnished with one end expanded, one end plain to permit quick assembly and rapid soldering or brazing, company says. Illustrations provided. Brazing, soldering procedures given. *Standard Tube Co., Dept. HPAC, 24450 Plymouth Rd., Detroit 39.*

▶ *THERMOSTAT WELLS* — Specifications on wells for thermostat applications in fluids, gases, high pressure environments included in new booklet. Copper, stainless steel designs suitable for immersion surface mounting. Each of seven designs listed has dimensions, operating specifications. *Fenwal Inc., Dept. HPAC, Pleasant St., Ashland, Mass.*

▶ *THERMOSTATIC CONTROLS* — Temperature, pressure controls described in new 12 page booklet. Data on self-operating regulators, water mixing equipment, pneumatic control instruments, indicating and recording instruments, control valves presented. Equipment designed for industrial process control; heating, ventilation, air conditioning systems; commercial, institutional hot water service applications. *Powers Regulator Co., Dept. HPAC, 3434 Oakton St., Skokie, Ill.*

RECENT TRADE LITERATURE

Continued

▶ *THERMOSTAT METALS* — New 4 page technical bulletin TRU-6 entitled *Corrosion-Resistant Thermostat Metals* summarizes test results on various metals exposed to corrosive environments. Comparative thermal deflection graph, chart listing mechanical and physical properties for eight "Truflex" corrosion resistant thermostat metals included. *General Plate Div., Metals & Controls Corp., Dept. HPAC, 34 Forest St., Attleboro, Mass.*

▶ *TUBING* — New 8 page bulletin TR-550 entitled *Present Status and Future Potential for Titanium Tubing* describes method of producing titanium tubing. Product said by company to be immune to corrosive conditions. Two temperature charts, four illustrations provided. *Babcock & Wilcox Co., Tubular Products Div., Dept. HPAC, Beaver Falls, Pa.*

▶ *WATER SOFTENERS* — New 6 page bulletin 28-B-7107A describes sodium zeolite water softeners in sizes to 120 in. diameter. Units can be adapted to meet individual plant requirements, company says. Two views illustrate engineering, construction features. Capacity tables, specifications for series "S," "SA" designed for institutions requiring relatively low soft water flow rates included. *Allis-Chalmers Mfg. Co., Dept. HPAC, 1171 S. 70th St., Milwaukee 1, Wis.*

▶ *VALVES, CONTROLS* — New condensed 4 page brochure describes solenoid valves, controls. Categories covered under solenoid valves include 2-, 3-, 4-way corrosion resistant, manual reset, special purpose valves. Included in electromagnetic control categories are automatic transfer switches, remote control switches, contactors, relays, solenoids, electric plant controls. *Automatic Switch Co., Dept. HPAC, Florham Park, N. J.*

▶ *V-BELT DRIVES* — New 108 page manual A-661 describes v-belt drives.

HOW TO ISOLATE VIBRATION IN AIR CONDITIONING SYSTEMS

Here are eight practical solutions to your vibration problems

FOR ALL-PURPOSE USE
These rubber-in-shear vibration mountings are widely used for isolating vibration and noise on air conditioning equipment. Shipped complete, ready to use, their rated load is from 40 to 4000 lbs. Catalog RS-55.

FOR PUMPS COMPRESSORS, FAN-MOTOR SETS
Floating Rail vibration mountings have rubber-in-shear isolators. Rails are tapped and drilled to specification. Bases made for fan-motor sets are shipped complete, ready for installation. Catalog FR-55.

FOR SUSPENDED EQUIPMENT AND PIPING SYSTEMS
Two types of vibration hangers are available: rubber-in-shear (load range: 35 to 1500 lbs.), and steel spring (50 to 1400 lbs.). Both are extremely effective in preventing transmission of vibration from suspended equipment and piping systems. Catalog VH-55.

FOR WATER LINES
The original SOUNDZORBER. Wire-reinforced, wrapped-fabric, rubber pipe widely used for reduction of water line noise and vibration. Working pressures up to 250 psi. Sizes: ½ to 14" ID with I.P.T. male fittings or with full-faced rubber flanges backed up with Series 15 or 30 steel flanges. Catalog SZ-55.

FOR MASSIVE DIFFICULT-TO-ISOLATE EQUIPMENT
ISOLANT is an unusually strong and resilient material which provides excellent isolation of vibration, shock and noise. It is particularly suited for massive air conditioning equipment and similar machinery. Load range: up to 6000 lb. per sq. ft. Catalog IS-55.

FOR HEAVY EQUIPMENT
Steel Spring vibration mountings offer maximum vibration, shock and noise isolation of difficult-to-isolate low-speed machinery, heavy air conditioning equipment, and delicate instruments. Load range: from 100 to 6500 lbs. Catalog SS-55.

FOR FREON LINES
. . . a seamless flexible bronze tubing covered with woven wire braiding, is used to minimize vibration and noise in air conditioning and refrigeration freon lines. Standard copper tube female "slip fittings," welded on both ends, are available from ⅛" to 8" ID. Catalog FZ-55.

FOR STEAM AIR AND GAS LINES
. . . a stainless steel, welded-diaphragm-type, packless expansion joint used for control of vibration, expansion and contraction in steam, chemical, oil and gas lines. Working pressure from vacuum to 1000 psi at −300 to +1800F. Sizes: ½" to 24" with steel flange or weld end fittings. Catalog EZ-55.

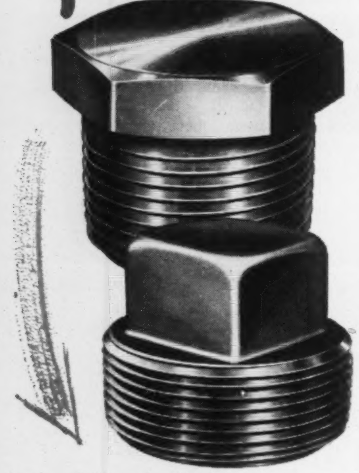
For complete catalog information, write—

FINN

VIBRATION FINNFLEX CONTROL

T. R. Finn & Company, Inc., Industrial Division
200 Central Avenue, Hawthorne, New Jersey

Industry's most complete line of shock and vibration controls plugs for Pressure



forged steel, high pressure plugs with DRY SEAL tapered threads

CAPITOL square head and hex head solid plugs have dry seal tapered threads to assure safe, permanent high pressure installations. Conveniently packaged for easier handling.

Square Head Solid Plugs sizes 1" thru 2", all forged steel. Hex Head Plugs sizes ½" thru 2" machined from solid bar.

You'll like these thread protectors, too!

CAP CAPITOL
MFG. & SUPPLY CO.
COLUMBUS, OHIO

COUPLINGS — NIPPLES — UNIONS — BUSHINGS — PLUGS — REDUCERS — CAPS—CAPADAPTERS—WELL SUPPLIES

RECENT TRADE LITERATURE

Continued

Covered are standard, variable speed, special drives; "Tapor-Lock" sheaves; "Sealed Life" v-belts; "Tapor-Lock" bushings, hubs. Engineering data, illustrations provided. Tables of pre-engineered drives, horsepower capacities, belt speeds, center distances, sheave diameters included. *Dodge Mfg. Co., Dept. HPAC, 500 S. Union St., Mishawaka, Ind.*

▶ *VENTILATORS* — "Rotoflo" turbine ventilators described in new bulletin. Capacities, dimensions provided. Construction features pointed out in large illustration. *Greenheck Fan & Ventilator Corp., Dept. HPAC, Schofield, Wis.*

▶ *WATER TREATMENT* — Information on Belgian magnetic device designed to prevent scale, corrosion in piping and industrial equipment presented in new bulletin. Device passes water, other fluids through highly concentrated magnetic fields at right angles to lines of force, therefore assuring maximum inductive effect, company says. Magnetic action said to induce physical change in incrustating salts. Crystalline structure of salts altered and they become essentially amorphous; they precipitate as fine powder which may be flushed away, according to manufacturer. Units handle 2 to 20,000 gpm. May be applied to boilers, heat exchangers, air conditioning systems, cooling water systems, humidifiers, etc. *Cepi-American, Inc., Dept. HPAC, 7767 North Ave., River Forest, Ill.*

▶ *WELDED STEEL PIPE* — New 8 page booklet has information on welded steel pipe for industrial uses. Diameters range 6 to 36 in.; wall thicknesses 9/64 to ½ in. Applications covered include factory piping; process piping; water supply, sewage disposal; contractor's pipe requirements; base products. Data on pressure design, dimensions, properties given. *Armco Drainage & Metal Products, Inc., Dept. HPAC, 703 Curtis St., Middletown, Ohio.* ‡

THE
NEW
DISTRICT
HEATING
HAND BOOK

THIRD EDITION

An Entirely New Volume — 529 Pages
15 CHAPTERS — 6"x9¼"

GROWTH AND PRESENT STATUS
ECONOMICS OF DISTRICT HEATING
GENERAL DATA
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ESTIMATING STEAM REQUIREMENTS
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SALES ACTIVITIES
HOT WATER FOR DISTRICT HEATING

Price $7.00

NATIONAL DISTRICT HEATING ASSOCIATION
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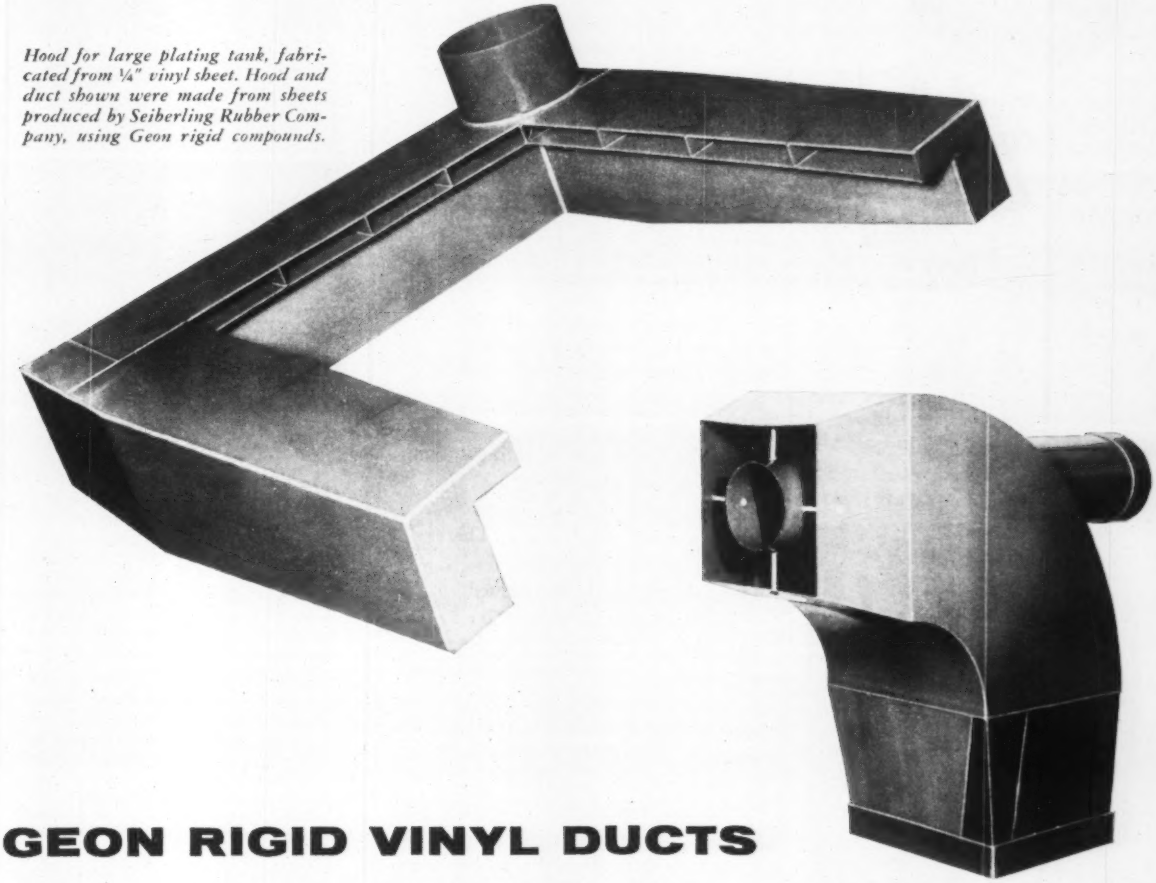
News about

B.F.Goodrich Chemical *raw materials*

Hood for large plating tank, fabricated from 1/4" vinyl sheet. Hood and duct shown were made from sheets produced by Seiberling Rubber Company, using Geon rigid compounds.



Fume duct fabricated from 3/16" vinyl sheets.

GEON RIGID VINYL DUCTS

carry away corrosion problems

WITH ducts, hoods, fans and fume stacks now being fabricated from rigid sheets made from Geon polyvinyl compounds, you can eliminate many corrosion replacement problems.

Rigid vinyl sheeting is available from many manufacturers in large sizes, in a range of gages, in normal or high impact grades. It is easy to form, can be worked with standard wood or metal working tools, and can be readily welded. Sheets made of Geon rigid vinyl offer superior resistance to oils, acids, alkalis, and most chemicals.

For booklet on properties of rigid Geon resins and compounds write Dept. LW-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Geon
Polyvinyl Materials

B.F.Goodrich Chemical Company
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B.F.Goodrich **GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors**

ONLY
SHAW
radiators
deliver
radiant and
convected
heat
Properly
Balanced

Shaw Panel Radiators distribute a carefully engineered combination of radiant and convected heat that only Nature, at her best, can rival.

Shaw's health-guarding proportions of radiant and convected heat will not vary regardless of hot water or steam temperature. There is no stratification – heat is distributed evenly throughout the room.

Investigate Shaw Panel Radiators. They are rugged, self-contained steel and copper units, of one-piece-bonded construction, easy to handle and install. Heights are 8" to 26"; lengths 11" to 111". Choice of same end or opposite end tapping on all models facilitates piping economies and proper radiator location. Write today for full information.

SHAW-PERKINS
MANUFACTURING COMPANY
201 East Carson St. • Pittsburgh, Pa.

1958 Forecast

(Continued from page 159)

Steam Heating to Level

COMMENTS by members of the Steam Heating Equipment Manufacturers Association reflect that total 1958 business in that sector will be maintained at the 1957 level. While some types of construction will lag, others will increase. Some of these opinions are:

"The steam specialty business has levelled off at the present plateau. This level will be maintained for some time."

"Recreational, public, manufacturing, and commercial buildings, as well as some other types of nonresidential construction, will be off slightly. At the same time institutions, hospitals, religious buildings, and schools should be up a bit."

"Our industry will continue to enjoy a profitable period. There is nothing in the offing about which we need to be particularly alarmed."

"If commercial construction throughout 1958 remains at the same level as the past six months, business may drop between 5 and 10 percent. However, if there is any increase in building construction, sales will be as good this year as in 1957."

"For the industry as a whole I am afraid that the low pressure heating specialties will show about a 5 percent drop in total usage in 1958. Medium pressure applications will be up about 7 percent."

"Increased expenditures for schools and other public institutions should help to maintain business in our industry at the same level as in 1957."

Steel Pipe Shipments Off

STANDARD STEEL PIPE shipments will be about the same during the first half of 1958 as for the last half of 1957—or about 20 percent under such shipments for the first half of 1957, reports George D. Lain, research engineer, Committee on Steel Pipe Research, American Iron and Steel Institute.

For the whole year it is predicted

(Continued on page 348)

COMPACT . . . LIGHTWEIGHT . . . STREAMLINED AND ACOUSTICALLY EFFICIENT
NO JOB WAITS FOR

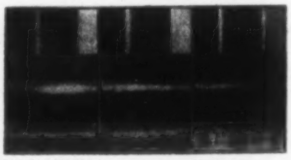
UNI-SILENCER
REG. U. S. PAT. OFF.

Single Unit
Standard Uni-Silencer

THE NEW SILENCER FOR AIR CONDITIONING AND VENTILATING SYSTEMS

UNI-SILENCERS* and UNI-RESONATORS* have been designed specifically to reduce the airborne noise generated by fans in industrial ventilating and air conditioning systems. Low in cost from both the original purchase and installation view, Uni-Silencers are delivered in cartons weighing about 75 lbs each. They may be easily and inexpensively transported into the building, to the specific location required.

UNI-SILENCERS* compare favorably in cost with conventional duct lining. When air flow, pressure drop, or noise attenuation require the use of more than one Uni-Silencer, then units (singles, halfs or quarters) may be set together using built-in slip joints. Thus in series, or in parallel Uni-Silencers will fit any condition or requirement.



Uni-Silencer singles and half units set together in block

UNI-SILENCERS* are supplied in 3 sizes: Full Unit-24x24x32": Half Unit-12x24x32": Quarter Unit-12x12x32".

UNI-SILENCERS* are sold on a guaranteed basis. Interior and exterior surfaces are smooth, made of perforated and unperforated metal to reduce resistance to a minimum.

Complete engineering services are yours, FREE!

*Reg. U. S. Pat. Off.

SEND FOR COMPLETE FREE LITERATURE

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711 Third Avenue, New York 17, N.Y.
Dept. U1-J

Please send complete literature on Uni-Silencers and Uni-Resonators, without charge or obligation.

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CITY ...... ZONE .... STATE ......

TIME FOR DRILLING 3½″ HOLES THROUGH 10″ REINFORCED MERAMEC GRAVEL CONCRETE FLOOR CUT FROM 6 HOURS TO 30 MINUTES

JOB: Cut 150 holes 3½″ diameter through 10″ concrete floors for new conduit feeders in the warehouse section of the old Mart Building, now the St. Louis Area Support Center, St. Louis, Mo. The Building, constructed in 1932, was built of concrete containing Meramac gravel aggregate—"the next thing to flint". Chiseling these holes would have resulted in jagged and uneven holes, much dirt and noise, a big clean-up job and much patching to finish up the job and would have averaged six hours each for two men.

CONTRACTOR: The Sachs Electric Corporation, St. Louis, Mo.

TOOLS: Model C Truco Diamond Drilling Machine with 350 rpm motor and 3½″ O.D. Truco Diamond Drill Bit.

DESCRIPTION: Truco unit was used mounted on its mobile base and moved to location on its rubber tired wheels. Actual drilling time on each hole was from 6 to 9 minutes depending upon the number of reinforcing rods to be cut. Each completed hole averaged 30 minutes including all moving, set-up and core removal. (Compare with previous 6 hours for two men with air hammers.) Completed hole was clean and smooth and no patching needed. Truco unit is completely portable by one man and is designed for high speed drilling in practically any location. Wired for 110 V, 60 cycles or less.

See our Exhibit at Booth 464, Plant Maintenance Show, Chicago

WRITE FOR NAME OF NEAREST DISTRIBUTOR

Truco Swivel Division
WHEEL TRUEING TOOL CO.
23-3200 W. Davison Ave. • Detroit 38, Michigan

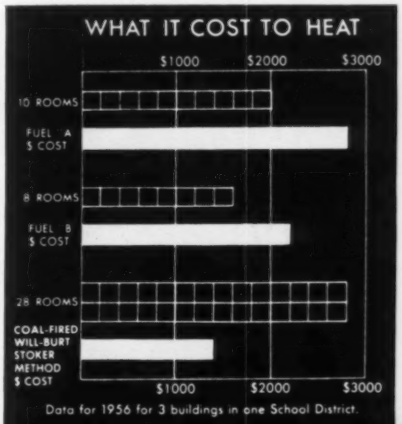
SAVES $1500!

SCHOOL SYSTEM USING 3 DIFFERENT FUELS PROVES ECONOMY OF WILL-BURT COAL-FIRED STOKERS

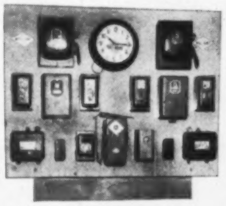
There has to be a sound reason for savings like these — and lower initial fuel cost *is* one reason.

More important is *efficient use of fuel — and* Will-Burt Air Controlled Stokers, as are used here, continuously and automatically regulate air supply according to fuel bed requirements. Efficient firing is assured, without close manual supervision, saving both time and fuel. A Will-Burt Panel Board (see inset) with limit and programming controls, makes this installation virtually self-operating.

Write for brochure, "The Logic of Stoker Heating." Engineering and advisory service available.



Data for 1956 for 3 buildings in one School District.



DALTON HIGH SCHOOL, a 28-room building, heated during an average year for only $1445.99 — using Will-Burt Stoker-fed coal heat. Will-Burt Panel Board shown adds to automatic control.

The WILL-BURT Company ORRVILLE • BOX 902 • OHIO
Our twenty-eighth year in the stoker business.

If you have a VIBRATION problem VM can solve it!

Yes, the RIGHT solution to vibration and noise transmission problems can almost always be found in
. . . our complete line of vibration control mountings and materials;
. . . the vast experience and understanding on vibration control problems of our expert engineers.
Increase operating efficiency, simplify installation, protect equipment in critical areas where noise transmission is a factor . . . ask a VM representative to call or send us your problem. . . DO IT TODAY! Bulletin VAC-12 "Vibration Isolation for Heating, Ventilating and Air Conditioning Equipment" is YOURS FOR THE ASKING. Write for your copy.

If it's a vibration or shock problem, get the right answer—quick—from

• Spring Flex (Steel Spring) Vibration Mountings
• Combination Spring and Rubber-in-Shear
Vibration Hangers
• Cork-Flex Mats
• Rubber-in-Shear Mountings
• Shear-Flex Pads
• Quiet-Flex Hose
• Integral Fan and Motor Bases Available with Neoprene Mountings or Spring-Flex Mountings and optional built-in one-piece motor slide base. Other products available: Rubber-in-Shear Mountings and Flexible Hose. Special designs furnished to suit unusual job conditions.

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GACO
THE MARK OF CORROSION PROTECTION

Men who know specify GACO

to stop corrosion in cooling tower drip pans

You don't have to be a hot engineer to know that cooling tower drip pans corrode rapidly. That's why men who know—the supervising engineer of the great new Socony Mobil Building in New York, for instance—specified GACO to avoid pan replacement every few years.

Here's how to stop corrosion in drip pans: Apply GACO N-200 liquid neoprene lining—a tough, flexible coating that adheres strongly to metal . . . will not crack or chip . . . and is virtually unaffected by salt spray, sunlight, or corrosive atmospheres. For piping and structural steel use GACO N-700 liquid neoprene maintenance coatings.

GACO coatings are performance-proven on cooling tower installations in The Socony Mobil Building, Radio City, and Ohrbachs in New York—to mention just a few. *Write for complete information*

PIONEER LEADER IN PROTECTIVE COATINGS
GATES ENGINEERING COMPANY • WILMINGTON 99, DELAWARE

1958 Forecast

(Continued from page 346)

that shipments will be about 15 percent under those for 1957.

Shipments declined considerably during the last six months of last year. Until that time they trailed the same period in 1956 by 7.5 percent. Such a decline was anticipated for July and August, with the usual seasonal pickup for the last four months. This pickup did not materialize.

Oil Needs to be Sold

"OIL HEATING has lost ground in the last couple of years," says R.H.L. Becker, managing director, Oil-Heat Institute of America, Inc., "and we must reverse the trend.

"The market is there for oil heating, but the advantages have not been sold properly.

"1958 can be a record year if oil is sold. All of this should take place because of greater emphasis on modernization of heating plants, new types of construction, and many other factors.

"We are planning to make this a good year by increasing our efforts to stress quality and not price," Mr. Becker concluded.

LP Gas Outlook Optimistic

IN A POLL conducted by the Liquefied Petroleum Gas Association, 94 percent of the members contacted feel that their businesses should be on a par with or better than 1957 levels.

A definite rise in business levels averaging 11 percent is confidently anticipated by 61 percent of the members polled.

Any pessimism was reflected in fields other than central heating. In fact, this exception was substantiated by write-in comments with evidence of planned activity to further the sales, installation, and utilization of LP gas central heating. ‡

♥ HELP YOUR HEART FUND HELP YOUR HEART ♥

HEATING EQUIPMENT
BY EMBASSY
• CONVECTORS
• BASEBOARD
• BOILERS
WRITE FOR FREE CATALOGS
DEPT. HP
• FIN TUBE
Embassy Steel Products Inc
EMBASSY STEEL PRODUCTS, INC.
890 STANLEY AVE. • BROOKLYN 8, N. Y.

20
YEARS OF
SERVICE

FIGHT
INFANTILE
PARALYSIS

MARCH OF DIMES

MUNDET

Your Best Buy...
ENGINEERED INSULATION
by MUNDET

The difference between two kinds of insulation may be many years of trouble-free service . . . an advantage that may far outweigh the initial cost factor.

Mundet engineered insulations are precision-manufactured to serve you for your individual requirements . . . longest . . . best!

You can depend on Mundet for these benefits:

1. A full line of thermal insulations for all temperature ranges . . .
2. Prompt attention to your needs and speedy deliveries from nearby Mundet warehouses

MUNDET INSULATION PRODUCTS

include "custom-molded" 85% Magnesia heat insulation and "Tri-Calite" insulation for higher temperatures. Also Mundet's Expanded Polystyrene Pipe Covering and Mundet's Expanded Polystyrene Board Insulation, and Corkboard and Cork Pipe Covering for low temperatures.

MUNDET CORK CORPORATION
Insulation Division
7101 Tonnelle Ave., North Bergen, N. J.
OFFICES IN PRINCIPAL CITIES

COMPLETE INSULATION SERVICE . . .

WHO'S WHAT . . .

(New personnel, promotions)

▶ *HOOKER ELECTROCHEMICAL CO.* — Thomas E. Moffitt, president, succeeding Bjarne Klaussen who will continue as a director; Ansley Wilcox, vice president, secretary, general counsel; Thomas F. Willers, vice president, treasurer, comptroller; John F. Snyder, retired vice president, director and member of finance committee; J. Clarke Cassidy, director and former vice president, finance committee member.

▶ *IRON FIREMAN MFG. CO.* — Lewis J. Cox, president.

▶ *MATHES CO.* — John J. Hildebidle, executive vice president; Edward H. Schwartz, vice president, engineering and manufacturing; George H. Childers, vice president, sales.

▶ *KAISER ENGINEERS, DIV. OF HENRY J. KAISER CO.* — David F. Shaw, vice president.

▶ *CONNER ENGINEERING CORP.* — P. F. Canavan, Jr., vice president and general manager.

▶ *O. A. SUTTON CORP., INC.* — Walter Schmidt, vice president of engineering.

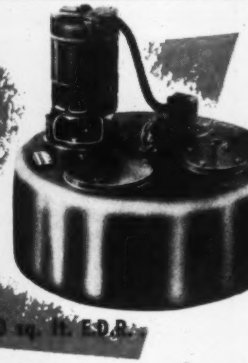
▶ *AIR MOVING AND CONDITIONING ASSOCIATION, INC.* — New 1958 officers are: James W. Wilcock, general sales manager, Sturtevant Div., Westinghouse Electric Corp., president; R. A. Wasson, vice president and general manager, Clarage Fan Co., L. A. Macrow, manager of the systems and equipment department, Machinery and Systems Div., Carrier Corp., W. H. Rietz, president of Ilg Electric Ventilating Co., all vice presidents; J. J. Merrick, division sales manager, John J. Nesbitt, Inc., secretary-treasurer; Marshall F. Allen, executive vice president; Robert K. Guy, assistant to the executive vice president.

▶ *BRYANT MFG. CO., DIV. OF CARRIER CORP.* — David W. Hoppock, vice president and general sales manager.

▶ *SUNDSTRAND MACHINE TOOL CO.* — G. J. Landstrom, financial vice president and secretary; James W. Ethington, treasurer and controller.

▶ *CORY CORP.* — Jack Matteson, director of sales training for air conditioning contract sales division.

▶ *H. N. HARTWELL & SON, INC.* — Charles V. Campbell, engineer of industrial plastic division.



THE
weil TVC

New 26 Gallon TVC Receiver

Condensate Pumps

- LOW RETURN CONNECTION
- LOW SPEED — LONG LIFE
- CAST IRON RECEIVER
- LOW WATER LINE

Capacities to 15,000 sq. ft. E.D.R.

Features:
Low speed (1750 RPM) TVC pumps are easily installed in areas where space is important. Their compact cast iron receiver and sturdy pumping unit assure a trouble-free installation.

Dimensions:
26 gallon cast iron receiver for single or duplex units: Diameter 25″; height of return above floor 10½″; height of unit 36″ max.

Installation:
Simple installation: one return connection, one discharge connection. Unit is completely assembled at the factory. Send for Bulletin TVC-300.

Send for Bulletin TVC-300

See Catalog in 1958 Sweet's and 1958 Domestic Eng. Cat. Dir.

Available from Jobbers Stocks!

TVC PUMPS now available in capacities from 750 to 15,000 sq. ft. E.D.R.

The three sizes of TVC receivers now offer a complete line of low pressure system condensate pumps to fit all requirements. The LOW RETURN CONNECTION and LOW SPEED — 1750 R.P.M., coupled with the built-in durability, operating efficiency and low cost of these pumps guarantee a satisfactory and trouble free installation. This pump provides gravity drainage for low heating units.

Specify and install a **weil** TVC Pump.

Built for ONE MILLION STARTS . . . without attention

weil PUMP CO.

1514 North Fremont Street • Chicago 22, Illinois

HOW TO CUT APPLICATION COSTS

in Protecting Pipe and Pipe Joints Against Corrosion

Let

TAPECOAT®

do the job without Kettles, Hot Stuff, or Special Crews

When specifications call for hot applied coal tar protection of underground piping as in AWWA specifications C-203 and C-204, and the volume does not justify the cost of shipment to a mill for coating—TAPECOAT offers a practical solution. Here is a widely-accepted alternate material that is equivalent to mill-applied hot coal tar protection.

With this coal tar coating in handy tape form, piping contractors can use their own personnel to do the job because technical know-how and special equipment are not required. You save time and money and eliminate the need for sub-contracting in assuring the long-life protection called for.

TAPECOAT is easy to apply, using a torch to soften and bleed the pitch which provides both bond and protection. Available in widths of 2", 3", 4", 6", 18" and 24", it is spirally wrapped or cigarette wrapped around the vulnerable surfaces.

Since 1941, TAPECOAT has proved its ability to fight corrosion on pipe, pipe joints, mechanical couplings, conduit, cable and insulated piping.

Write for illustrated brochure.

The **TAPECOAT®** *Company*

Originators of Coal Tar Coating in Tape Form

1555 Lyons Street
Evanston, Illinois

WHO'S WHAT

Continued

▸ *U. S. INDUSTRIES, INC.* — D. A. Stromsoe, president and general manager; R. A. Stumm, chairman of the board and chief executive officer; D. N. Chamberlain, executive vice president, all in the Southern Pipe and Casing Co. Div.

▸ *WHIRLPOOL CORP.* — Walter G. Seeger, chairman of the board of directors, has relinquished his position. He is continuing as a director.

▸ *ARMSTRONG CORK CO.* — Albert H. Sheaffer, acting secretary, following retirement of Keith Powlison, vice president and secretary who had been with the firm continuously since 1932. John E. Zeller, general superintendent of construction in insulation contract operations; Robert H. Lawrence, assistant in contract operations.

▸ *AMERICAN INSTITUTE OF MINING, METALLURGICAL, AND PETROLEUM ENGINEERS* — Organization's James Douglas gold medal award presented to J. Roy Gordon, executive vice president of International Nickel Co. of Canada, Ltd., and International Nickel Co., Inc.

▸ *PUROLATOR PRODUCTS, INC.* — Gerard W. Ahrens, manager of industrial sales.

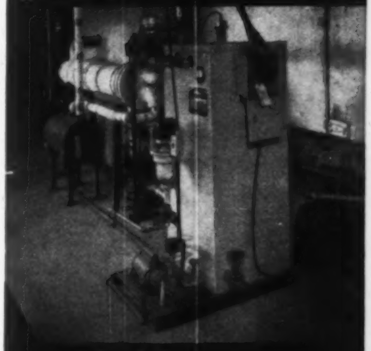
▸ *JOSEPH T. RYERSON & SON, INC.* — Meryl B. Draper, general superintendent of Wallingford, Conn., steel service plant.

▸ *WATER SERVICE LABORATORIES, INC.* — Henry L. Shuldener, Jr., assistant secretary.

▸ *RYAN CONSULTING ENGINEERS* — William F. Ryan, president, elected director of National Society of Professional Engineers.

▸ *DUNKIRK RADIATOR CORP.* —Allan B. McLellan, sales manager.

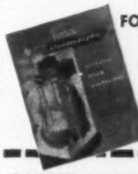
Pantex SPEEDYLECTRIC STEAM GENERATOR



Ideal Answer to 10 PROBLEMS in Supplying Steam

- **Without flame, flues or stack**
- **At higher pressures or temperatures**
- **At adjustable pressure or temperature**
- **With a constant high quality**
- **Without long steam lines**
- **To serve summer processing needs**
- **To meet extra load needs**
- **For lab, test, or pilot-plant use**
- **Where an unattended boiler is desired**
- **Where boiler space is limited**

In many such situations, a Speedylectric Steam Generator is the best or only solution. Using the electrode method of generating steam electrically, completely safe anywhere, its design eliminates low-water hazard and practically removes the need for supervision. Generation is fast, by the simplest and most economical electric method, and adjusts automatically to meet load demand. Upkeep is nil . . . there are no coils, tubes or heating elements to scale or burn out. Sizes from 2 to 50 Bhp, 15 to 500 psi. Higher pressures are available. Electric power 220, 440, or 550 volts A. C. UL listed, ASME code.



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Send for Bulletin SG-100: operating principles, application features, detailed specifications for complete line.

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Box 660AT, Pawtucket 11, R. I.
Send me Bulletin SG-100 . . . free

Name..
Title..
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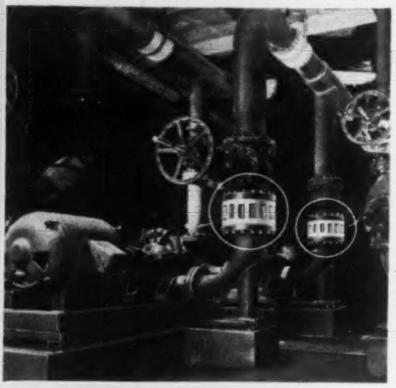
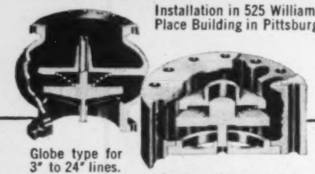
STOP
SURGE-PRESSURE
DAMAGE
in Air Conditioning
Systems



Installation in 525 William Penn Place Building in Pittsburgh.



Globe type for 3" to 24" lines.
Center-guided type for 1" to 10" lines.

WILLIAMS-HAGER
FLANGED
Silent
CHECK VALVES

Surge pressures . . . and resulting water hammer . . . are effectively controlled by these valves. They close instantly whenever flow reversal starts, or when flow is zero—providing dependable protection for piping, pumps and other components in air conditioning systems.

Water Hammer-
Williams-Hager Flanged VALVES

Write for Bulletins:
No. 654 on the Valves
No. 851 on Cause, Effect and Control of Water Hammer

CHECK WG VALVES
THE WILLIAMS GAUGE CO., INC.
155 Stanwix Street
2 Gateway Center Pittsburgh 22, Pa.
Our 72nd Year • 1886-1958

WHO'S WHAT

Continued

▸ *RUBEROID CO.* — John Lang and Frederick K. Sweeney, general merchandising manager and general sales manager, respectively.

▸ *ROBINAIR MFG. CORP., DIV. OF KENT-MOORE ORGANIZATION, INC.* — Robert Biship and Harold Tubbs, sales manager and plant manager, respectively.

▸ *UNITED STATES AIR CONDITIONING CORP.* — William C. McMichael, general sales manager.

▸ *YORK CORP.* — Lloyd D. Wasson, general manager of packaged products.

▸ *E. I. DUPONT DE NEMOURS & CO.* — Warren L. Hotmer, marketing assistant in wholesale refrigerant sales section of "Freon" products division.

▸ *CUTLER-HAMMER, INC.* — Thomas J. Manning, plant manager of new plant now under construction at Lincoln, Ill.

▸ *BITUMINOUS COAL RESEARCH, INC.* — Wilbur D. Lawson, field service engineer.

▸ *AMERICAN AIR FILTER CO., INC.* — Frank K. Platt, central regional manager.

▸ *THOR POWER TOOL CO.* — William J. McGraw, general sales manager; Walter G. Mitchell, general manager of product development.

▸ *PHILCO CORP.* — James T. McMurphy, sales manager air conditioning department.

▸ *KOCH ENGINEERING CO., INC.* —Bill T. Lindsey, sales manager; Earl H. Schreiber, sales engineer.

▸ *AMERICAN-STANDARD, PLUMBING AND HEATING DIV.* — Brendan P. O'Connell, manager of sales coordination.

▸ *RANCO, INC.* — F. A. Greenawalt, director of research; J. E. Kumler, chief engineer.

New Concept
in Interior
Wall Finish
for
Low Temperature Rooms,
Coolers and Freezers

Swift's
ADCOTE
Adhesive Finish

While Adcote was developed for use on insulation in low temperature freezer and cooler rooms, tests have indicated it is also a superior finish for concrete, brick and dry wall construction. Contractors who have used it have been particularly pleased with the ten advantages Adcote provides:

1. GOOD COLOR STABILITY
2. EASE OF APPLICATION
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8. MOLD RESISTANCE
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10. WASHABILITY

To get full information write for the new Adcote descriptive bulletin. And ask how you may test Adcote under your own conditions. SWIFT & COMPANY, Adhesive Products Dept., Chicago 9, Illinois.

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102ND YEAR
To Serve Your Industry Better

WHO'S WHAT

Continued

▶ *FEDDERS QUIGAN CORP.* — Edwin P. Hart, manager of sales administration.

▶ *LAARS-ENGINEERS*—Jim Cox, general sales manager.

▶ *DE LAVAL STEAM TURBINE CO.* — Mervin T. Flock, production and procurement manager; Richard P. Springle, purchasing agent; Donald T. Bixby, assistant manager of standard products division.

▶ *SQUARE D CO.* — Paul A. Christenson, works manager of industrial controller division.

▶ *DRAYER-HANSON, DIV. OF NATIONAL-U. S. RADIATOR CORP.* — Ugo Rostagno, sales department office manager.

▶ *JOHN WOOD CO.* — T. E. Carson, manager of heating sales.

▶ *UTILITY APPLIANCE CORP.* — P. L. Chabre, national sales promotion manager.

▶ *DELAVAN MFG. CO.* — Roger Tate, director of research.

▶ *TRANE CO.*—Harry J. Watson, manager service department.

▶ *FLEXONICS CORP.* — James R. Strother, assistant sales manager for industrial hose products.

▶ *BABCOCK & WILCOX CO.* — Robert P. Stuntz, assistant sales manager of refractories division.

▶ *WOLVERINE TUBE, DIV. OF CALUMET & HECLA, INC.* — R. M. Frink, director, new products division; E. C. Walter, director of operations.

▶ *UTILITY APPLIANCE CORP.* — Stanley F. Skafte of Los Angeles, engineering director, will represent western section of the nation on national approval requirements committee of American Gas Association.

▶ *MANNING, MAXWELL & MOORE, INC.* — Arthur W. Johnson, manager of "Ashcroft Gauge" products; Jack E. Cox, manager of "Consolidated Safety" valves.

▶ *CRANE CO.* — George F. Burley, vice president for purchasing and traffic.

▶ *BARBER-COLMAN CO.* — Roy Hardy, government services representative for automatic controls division.

INSULATION APPLIED PERMANENTLY

At Savings Up To 4 Cents Per Square Foot
With the

GRAHAM® INSUL-PIN® WELDER

Works with all types of insulation on duct work, breechings, tanks or boilers regardless of temperatures involved. Just press gun against metal surface to attach a GRAHAM INSUL-PIN permanently. You can apply insulation immediately, secure with a GRAHAM INSUL-CLIP and the job is done — At a fraction the cost of other methods.

OVER 50 MILLION SQUARE FEET OF INSULATION HAVE BEEN PERMANENTLY SECURED BY THE GRAHAM INSUL-PIN SYSTEM

Advantages include:

- Permanency
- Lower cost
- Insulation can be applied immediately
- Scaffolding assembled but once
- Works from 110 Volt A.C. outlet
- Simplicity in operation
- No timer — No adjustments
- Depression of gun completes weld
- Will not mark or burn opposite surface of metal

For further information
and price list write to:

GRAHAM MANUFACTURING CORPORATION
152 Second Avenue
Needham Heights 94, Mass.

Manufacturers also of
Industrial Stud Welding Equipment

Graham Model 6000D
Insul-Pin Welder

WHO'S WHAT

Continued

IN THE TERRITORIES . . .

(Recent sales appointments)

▸ *ALLIS-CHALMERS MFG. CO.* — A. D. Brown, mid-Atlantic regional office staff member; C. W. Parker, Jr., manager of Philadelphia district; J. M. Mathews, manager of Richmond district; Gordon Hood, manager of Charleston district.

▸ *PREFERRED UTILITIES MFG. CO.* — New representative in northern Illinois and adjacent Indiana, Wisconsin areas is Thermo Dynamics, Inc., Chicago.

▸ *AMERICAN BLOWER, DIV. OF AMERICAN-STANDARD* — F. L. Matthews, manager of new Amarillo, Tex., branch office.

▸ *REMINGTON CORP.* — Philip H. Gauthier, midwest regional manager.

▸ *ZALLEA BROS.* — Bogart-Bullock Co., sales representative for Los Angeles territory.

▸ *G. S. ZIEGLER CO.* — Leigh G. Tanger, representative for Cleveland area.

▸ *POWERS REGULATOR CO.* — J. L. Fitzgerald, San Francisco branch manager; Preston R. Maxson, manager of Jackson, Miss., office; Ralph Schoverling, manager of Baltimore office.

▸ *WALWORTH CO.* — John P. Carr, assistant manager of central division with headquarters in Pittsburgh.

▸ *SPORLAN VALVE CO.* — Terry J. Allen, sales engineer at Cincinnati office.

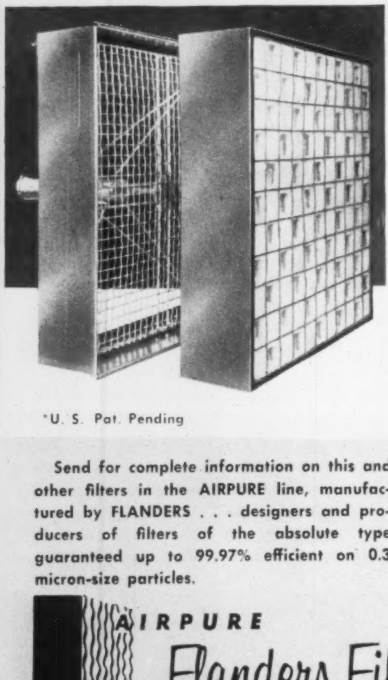
▸ *DRAYER-HANSON, DIV. OF NATIONAL-U. S. RADIATOR CORP.* — Ray Goodwin Co. of Omaha, representative for Nebraska, lower portion of South Dakota; George R. Mellema Co., representative for Minnesota.

▸ *FEDDERS QUIGAN CORP.* — George Schwartz, sales manager to serve Ohio, Michigan, Indiana territory.

▸ *PAYNE CO.* — William F. Steiner, factory sales engineer for northern California territory.

▸ *MILWAUKEE VALVE CO.* — Walter Ellingboe, representative for Wisconsin, northern Michigan, eastern Iowa territory.

EXPANSION



*U. S. Pat. Pending

MAKES THE DIFFERENCE ....

Flanders' exclusive EXPANSIBLE* design in filters makes use of both surface area and depth, for dust particle storage. This means loadings four times greater than those achieved with conventional filters . . . cuts filter replacements by as much as 75%.

Here's a unit that literally breathes new life into filtering efficiency. Installed in a compressed state, it expands as the pressure drop increases, allowing dust to migrate deeper . . . leaving surface areas free to trap particles at minimum resistance. The expansion process keeps filter-resistance close to initial values throughout the life of the filter. Entire operation is automatic . . . warning light indicates when filter change is needed. Four wing nuts make filter pack replacement quick and easy. Comes complete with expanding mechanism, pressure switch and holding frame . . . can be installed singly or in multiple banks, depending upon requirements.

EFFICIENCY CHART

Type Filter	ASHAE Test % by Weight	N.B.S. Discoloration Test Atmospheric Dust, % By Stain
Flanders EXPANSIBLE #14	85—95	65—75
Flanders EXPANSIBLE #15	95—99	80—90
Electrostatic Precipitation	99	85—90

Send for complete information on this and other filters in the AIRPURE line, manufactured by FLANDERS . . . designers and producers of filters of the absolute type guaranteed up to 99.97% efficient on 0.3 micron-size particles.

AIRPURE

Flanders Filters INCORPORATED, RIVERHEAD, LONG ISLAND, NEW YORK

Safer...Quicker Pipeline Repairs

WELD + ENDS Permits Welding a Pipeline While Pumping Through It

A pipeline safety welding coupling for crude oil, gas, gasoline, asphalt, steam, chemical process and other pipelines. WELD + ENDS joins pipe securely so flow can be resumed immediately at full pressure. Welding can be performed while pipeline is in use days or weeks later. Sizes 2" to 36".

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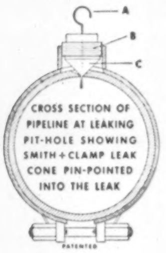
Smith + Clamp Permits Plugging and Welding Pit-Hole Leaks in a Pipeline While Pumping Through It


A
B
C
CROSS SECTION OF PIPELINE AT LEAKING PIT-HOLE SHOWING SMITH + CLAMP LEAK CONE PIN-POINTED INTO THE LEAK
PATENTED

Smith + Clamp shuts off more easily, quickly and safely than ordinary clamps. Use on high and low pressure gas, gasoline, crude oil, water, steam, air, chemical process and other pipelines. Sizes 1" to 30". Combine with WELDPLATE when pipe reinforcement is specified.

Write today for complete information on these latest developments in safer, quicker pipeline repairs: Weld + Ends and Smith + Clamp. Address Dept. H-1

THE PIPE LINE DEVELOPMENT CO.

5700 DETROIT AVE., CLEVELAND 2, OHIO

WHO'S WHAT

Continued

▶ *TRANE CO.* — Two sales representatives are David L. Jessee at Columbus, Ohio, branch office; Hubert Gangl, Jr. at Knoxville, Tenn., office.

▶ *FURNAS ELECTRIC CO.* — Robert R. Smith of Akron, Ohio, sales representative.

▶ *TUBE MANIFOLD CORP.* — Frank May, factory representative in St. Louis area.

▶ *BOHN ALUMINUM & BRASS CORP., BETZ DIV.* — Representative for Oklahoma, Texas territory is Philip T. Miner of Dallas.

▶ *RECOLD CORP.* — Distributor in Tulsa area is Palmer Supply Co.

▶ *KAYKOR INDUSTRIES, INC.* — Wagner Bros., Inc., distributor for Detroit area.

▶ *DEMING CO.* — William E. McNeal, factory representative for Oklahoma.

▶ *PULLMAN VACUUM CLEANER CORP.* — S. C. Quarantello, field sales manager.

▶ *GIBSON REFRIGERATOR CO., DIV. OF HUPP CORP.* — Three distributors are Midwest Motor Parts, Inc., Wichita, Kan.; H. A. McRae & Co., Inc., Troy, N. Y.; P. J. Morahan Co., Philadelphia.

▶ *C. E. SQUIRES CO.* — Leigh G. Tanger, representative for Cleveland area.

▶ *PENN CONTROLS, INC.* — Robert D. Eichman, sales engineer, in Goshen, Ind., transferred to Milwaukee district office to assist H. D. Gray, manager.

▶ *BUNDY TUBING CO.* — Mill sales representative is Atlantic Tube & Metals, Inc., Wayne, N. J.

▶ *A. W. CASH CO.* — Thermal Industrial Engineering Co. of Denver, Colorado representative.

PALMER

presents

an outstanding improvement in

DIAL THERMOMETERS

CASE CAN BE ROTATED TO ANY READABLE POSITION
PALMER
0
20
40
60
80
100
120
140
160
180
200
220
240
°F
PALMER THERMOMETERS, INC. CINCINNATI, O. U.S.A.
Direct Drive
Mercury Actuated

external calibration

Full 3½" Dial Face

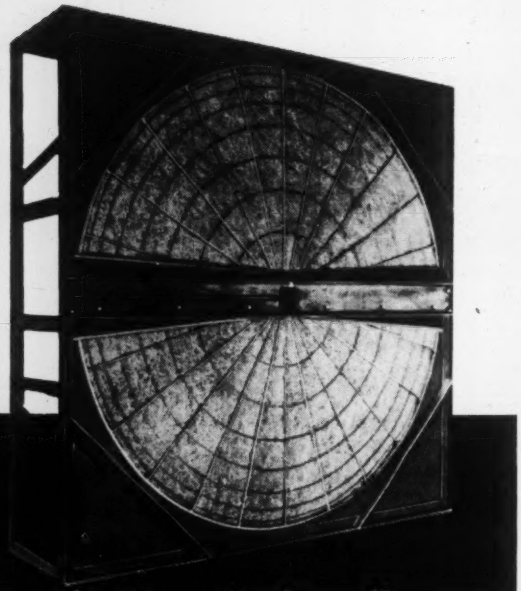
- No Sector
- No Pinion
- No Linkage
- Constant Accuracy
- Easy Readability

WRITE FOR BULLETIN 350

PALMER

THERMOMETERS, INC.

Norwood Ave., Cincinnati 12, Ohio
Mfrs. of Industrial Laboratory Recording and Dial Thermometers



comfort and cleanliness
PLUS
heat savings*
WITH

THERM O WHEEL

The EFFICIENT Heat Exchanger for Heating, Ventilating & Air Conditioning Systems

*Look to THERM-O-WHEEL, when looking for savings in your fuel bill! Don't let your exhaust system throw away precious heated (or cooled air) when exhausting air which has been contaminated by use.

TESTS SHOW THAT THERM-O-WHEEL YIELDS 80% to 85% HEAT TRANSFER EFFICIENCY!

Heat transfer with Therm-O-Wheel is a continuous process — made most economical by the recovery efficiency of this proven money saving unit!

Installations among Schools, Factories and Commercial Buildings include:

Johnson & Johnson
Kroger Warehouse & Bakery Co.
Merck & Co. Ltd.
National Research Council
Minn. Pulp & Paper Co. Ltd.
West Hill Mines

Abrasive Products Co., Inc.
Westmount Public School
Aluminum Co. of America
Ecola Polythechnique
Elmendorf Air Force Base
General Aniline & Film Corp.
Hudson Pulp & Paper Co.

Write today for Complete Details

THERM O WHEEL
INCORPORATED

P. O. Box 577
Far Rockaway, N. Y.

WHO'S WHAT

Continued

▶ *INDUSTRIAL ACOUSTICS CO.* — Sales representatives are John B. Hewett Co., Inc., New York, and A. G. Allen & Co., Indianapolis.

▶ *WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV.* — Sales agent for St. Paul territory is McNamara Sales Co.

▶ *SEAMLESS RUBBER CO.* — Dearborn Chemical Co. of Chicago, national distributor for "F. O. S. Safe-T-Clad" tape.

▶ *ARMCO STEEL CORP.* — William M. Orr Co., Inc., Pittsburgh, distributor of "Armco" stainless steel.

▶ *AUTOMATIC SWITCH CO.* — Stocking distributors of "Asco" solenoid valves are Park Supply Co., Bridgeport, Conn., and Textile Mill Supply Co., Charlotte, N. C. Standard Electric Sales, representative in Seattle, Wash., has moved to 204 W. Lucile St.

▶ *HEIL-QUAKER CO.* — New representatives are James E. Fahl for eastern Pennsylvania, northern Virginia, Maryland, Delaware, Washington, D. C.; R. J. Heiting for Michigan, Ohio. ǂ

You Name It . . .

There's a G&O Finned Tube For Every Heating & Cooling Need

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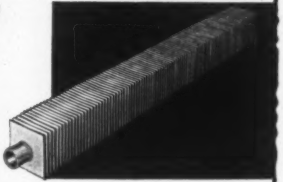
G&O
"The Finest"



When quality in heating or cooling products is uppermost, the brand of finned tube that's uppermost in manufacturers' minds is G & O . . . famous for quality, excellence of design and construction, experience in engineering applications, fine workmanship and superior heating-cooling efficiency since 1915.

To improve your heating-cooling product of the future, write today for G & O literature on Finned Tubing in • straight lengths, U-bends, continuous return-bend coils, and special shapes for use in • heating coils, • unit heaters, • blast coils, • intercoolers, • after-coolers, • baseboard radiation, and • convector elements.

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THE G&O MANUFACTURING CO.
Pioneers in Square Finned Tubing
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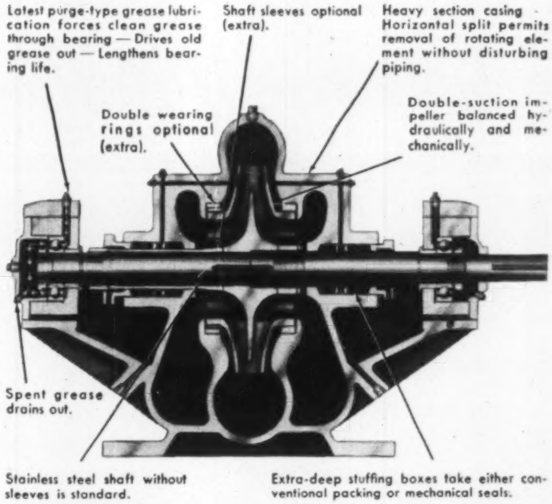
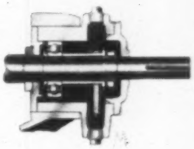
◀ *The "GO" Sign for Superior Heat Transfer*


Latest purge-type grease lubrication forces clean grease through bearing — Drives old grease out — Lengthens bearing life.
Shaft sleeves optional (extra).
Heavy section casing - Horizontal split permits removal of rotating element without disturbing piping.
Double wearing rings optional (extra).
Double-suction impeller balanced hydraulically and mechanically.
Spent grease drains out.
Stainless steel shaft without sleeves is standard.
Extra-deep stuffing boxes take either conventional packing or mechanical seals.

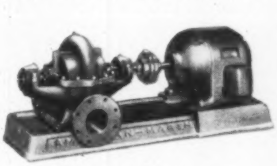
New Purge-type Grease Lubrication
CUTS PUMPING COSTS
on American-Marsh Type HLM and HIM Split Case Centrifugals

What does Purge-type Grease Lubrication offer you? Just this: By pushing out spent or dirty grease every time bearing is lubricated, it adds years of extra bearing service. That means less maintenance and longer pumping service from your total investment.


Ring-oiling ball bearings are also available (optional).

Many other superbly engineered features combine to eliminate interruptions and cut costs for A-M owners. Study the drawing a moment — You'll notice extra deep stuffing boxes and other details that are better designed, better built than ordinary pumps.

Then write for new HLM-HIM Bulletin 350, with full details and performance data.


HLM and HIM pumps are famous for low-cost service.

Pumps and Pumps only Since 1873

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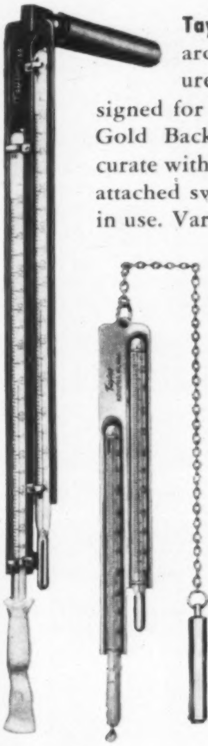
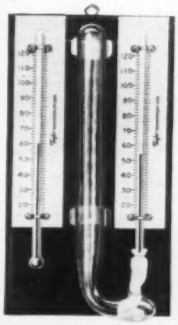
4 WAYS TO TELL WITH *Taylor*



Taylor Sling Psychrometer. The standard hygrometer for accurate measurement of relative humidity—redesigned for even simpler operation. New 9″ Gold Back etched-stem thermometers accurate within one scale division. New rigidly attached swivel handle folds back when not in use. Variety of F. and C. ranges available.

Pocket Sling Type Psychrometer—rugged metal mounting is 5″ long for convenience, has sturdy chain and handle for ready use. Range: 20° to 120°F. 1° divisions.

HYGRORULE eliminates need for cumbersome tables, translates wet and dry bulb readings into relative humidity values accurate within ±1% of table readings. One side calibrated for sling psychrometers, the other for still-air hygrometers. 6″ long, leather case.



Mason's Form Hygrometer is made for wall mounting in office, factory or home. Magnifying mercury or PERMACOLOR*-filled tubes, ranges from 30° to 220°F. Black markings on white scale. Mahogany or gray metal mounting. Complete with humidity tables and spare wick. 8½″ x 4½″. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

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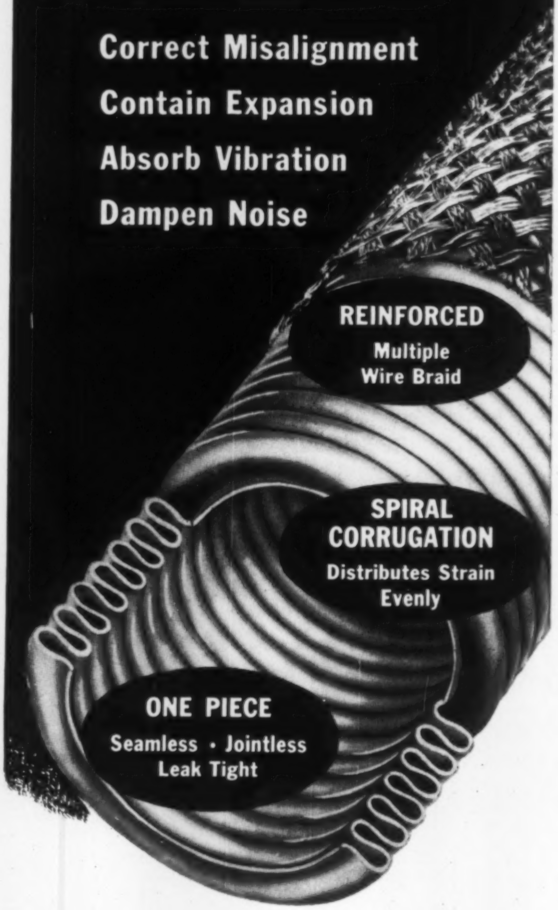

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WE HEAR THAT . . .

▶ Manufacturing operations of *WEBSTER ENGINEERING CO.* have been consolidated at 1400 S. 69th East Ave., Tulsa. Newly constructed buildings at the site valued at $500,000 include a 175 × 200 ft main plant, a 35 × 48 ft laboratory, and a 45 × 120 ft office building. Sheet metal, welding, machining, assembly, testing, shipping, receiving, and warehouse departments are housed in the modern plant.

▶ Divisional headquarters of the *WOLVERINE TUBE DIV. OF CALUMET & HECLA, INC.* are now located at a new administrative center in Allen Park, Mich. Future projects planned by the company include expansion of fabricating and manufacturing facilities at the Decatur, Ala., plant, a $4 million modernization program at the Detroit plant, and construction of a new $7 million plant in London, Ont.

▶ Ground has been broken for a new $400,000 manufacturing plant for *PARAGON ELECTRIC CO.* The 72,000 sq ft structure will be situated on a 27 acre tract and will eventually consolidate all manufacturing operations of the 52 year old company.

▶ *ROCKWELL MFG. CO.'s* new 180,000 sq ft plant at Kearney, Neb., is now in limited production. The plant, which cost more than $2 million, is located on a 52 acre site.

▶ A wholly owned subsidiary to be known as *ARMSTRONG CONTRACTING AND SUPPLY CORP.* is being formed by *ARMSTRONG CORK CO.* to handle all contracting operations now carried on by the firm's insulation division. Approval for the new subsidiary was given by the board of directors at a regular meeting. The new company, to be incorporated in Delaware, will have headquarters in Lancaster County, Pa. Personnel will be selected from the insulation division and general office of the parent company, according to officials of the firm.

▶ *HOWARD INDUSTRIES, INC.* has purchased the *UNIVERSAL MOTOR DIV., WESTINGHOUSE ELECTRIC CORP.* in Lima, Ohio. The purchase included all assets of the division with the exception of the land and building. All machinery and equipment has been installed in Howard's new 35,000 sq ft addition in Racine, Wis.

▶ *STERLING, INC.* has constructed a 21,000 sq ft plant and office building valued at $200,000 in Milwaukee. Adequate space is provided for future expansion.

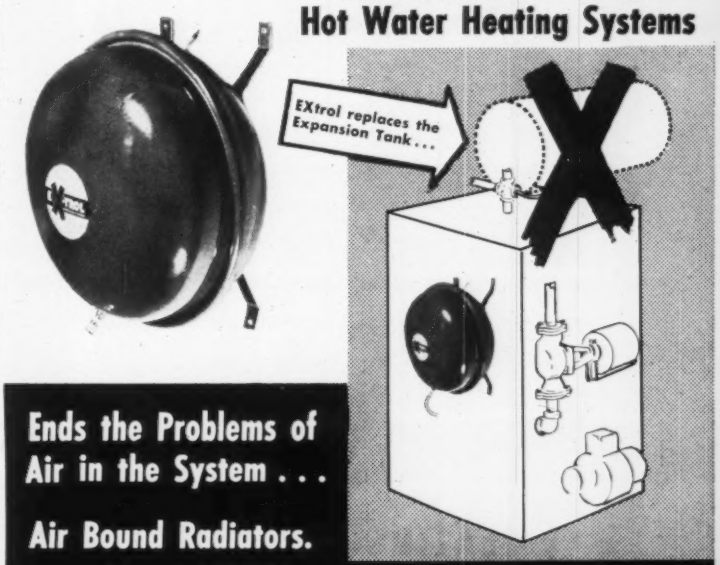
AMERICAN EX-TROL EXPANSION CONTROL

Engineered Expansion Control System

ELIMINATES THE CAUSE OF AIR TROUBLES

IN BOTH NEW AND EXISTING

Hot Water Heating Systems



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Replacing the expansion tank, the EXTROL SYSTEM controls and compensates for thermal boiler water expansion by means of a sealed pressurized expansion chamber which prevents any contact between boiler water and expansion air.

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Eliminating the labor and material cost of installing an expansion tank, tank drainer, air controls, and other air eliminating devices, the EXTROL SYSTEM costs no more to install on small jobs, and considerably less on larger installations.

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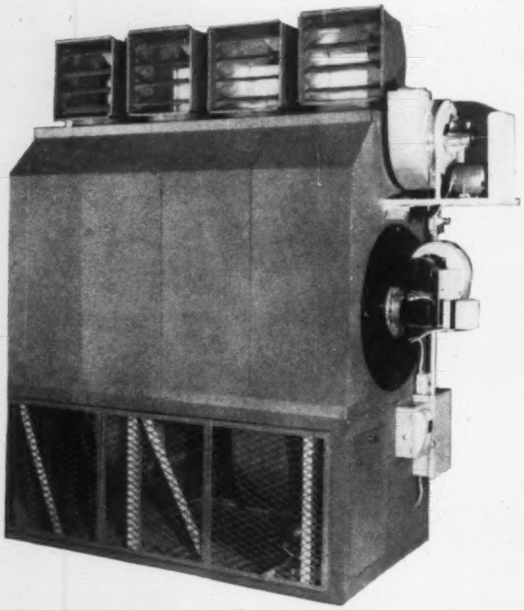

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▶ The addition of 40,000 sq ft to the *CHICAGO BLOWER CORP.'s* plant in Franklin Park, Ill., has doubled its production capacity, according to firm officials. The $250,000 project provides room for lengthening of production lines and further expansion.

▶ *AIR MOVING AND CONDITIONING ASSOCIATION, INC.* has approved the University of Detroit test laboratory for certifying performance ratings of air moving equipment. Fan testing and research has been in progress at the laboratory for the past decade. Professor *JOHN J. UICKER*, chairman of the university's mechanical engineering department, is director. *Y. WILSON YAMAUCHI* of the college of engineering faculty serves as his assistant. AMCA is currently inspecting test laboratories operated by manufacturers and independent institutions in the United States and Canada as part of the organization's certified ratings program. Aim of the program is to help equipment specifiers and users identify air moving products which perform according to published performance ratings.

▶ *HANDY & HARMAN* is constructing a new 23,000 sq ft plant in El Monte, Calif. Office, laboratory, refinery, operating, and warehouse space will be provided. Operations at the new installation are scheduled to begin next month.

▶ *TEXSTEAM CORP.* of Houston, a subsidiary of *VAPOR HEATING CORP.* of Chicago, has purchased assets of *GRAHAM-LEMUNYON CORP.*, Los Angeles. The purchase was made with 25 percent cash and 75 percent in Vapor stock.

▶ *FLEXIBLE TUBING CORP.* has opened a new warehouse and sales office in Hillside, Ill. The building provides warehousing facilities for the firm's line of products.

▶ *WAGNER ELECTRIC CORP.* recently expanded its St. Louis plant by more than 28,000 sq ft of floor space with the addition of a new manufacturing building.

▶ *WARD-LaFRANCE TRUCK CORP.* has entered the heating and ventilating field through an agreement to undertake sales, promotion, and manufacture of "Gannon" heating and ventilating units. LaFrance, a subsidiary of *GLEN ALDEN CORP.*, has been building "Gannon" units since last spring.

▶ *JOSEPH T. RYERSON & SON, INC.* has opened a new steel service plant at Charlotte, N. C. The installation, which replaces former leased quarters in the city, will serve the southeastern section of the country.

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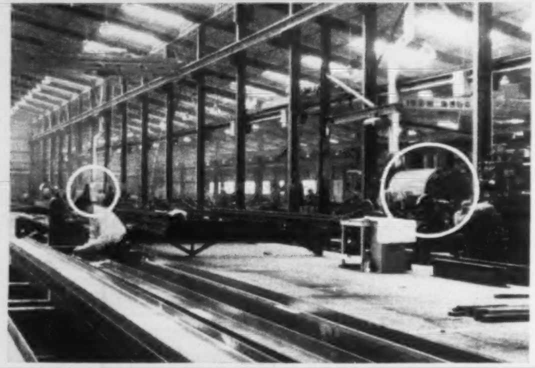

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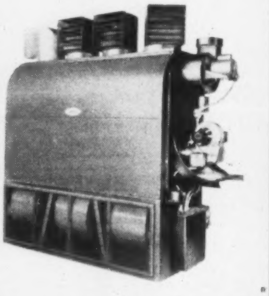

Carrier

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▶ *TRANE CO.* increased company floor space approximately 21 percent during 1957. Plant space was increased 23 percent in La Crosse, Wis., where the firm has its main offices. Included are a new 65,000 sq ft engineering technical center, a 60,000 sq ft shipping center, the first phase of a laboratory expansion, and a new 78,000 sq ft production facility. Expansions at Scranton increased facilities 21 percent. Plans for 1958 include completion of the second phase of the laboratory expansion which—coupled with the 1957 project—will result in doubling the research center dedicated in 1954. A $1½ million plant is now under construction in Clarksville, Tenn.

▶ *WILLIAM A. LANDERS* was elected president of the new *PLUMBING-HEATING-COOLING INFORMATION BUREAU*, formed by fusing the 38 year old Plumbing and Heating Industries Bureau and the All-Industry Plumbing and Heating Modernization Committee. The new bureau will embark on an expanded market development program. *WILLIAM A. FITZPATRICK* was elected vice president, *NORMAN J. RADDER*, secretary, and *V. J. KILLIAN*, treasurer.

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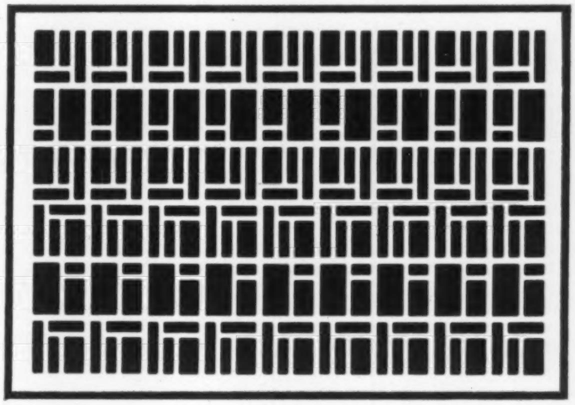

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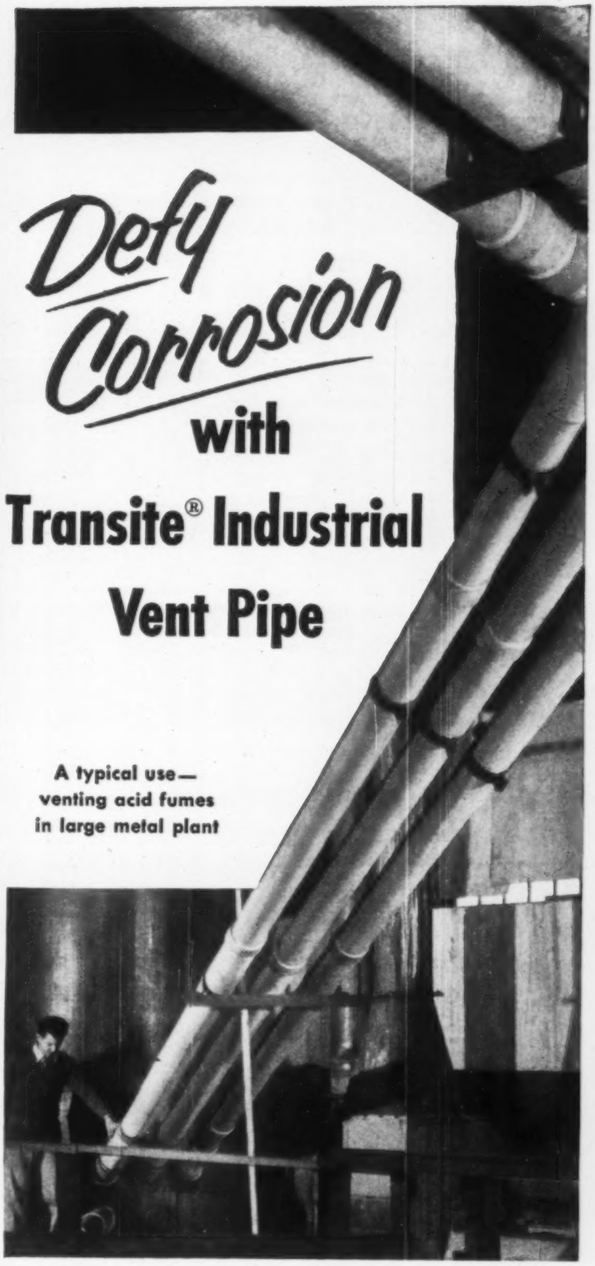

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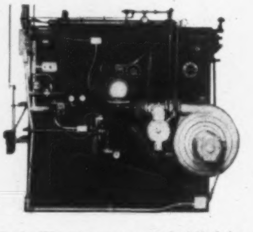

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WE HEAR THAT

Continued

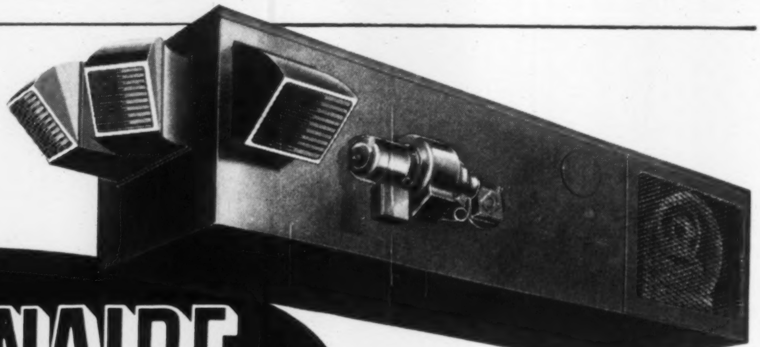
▶ A statewide consulting engineer's organization known as the *NEW YORK STATE ASSOCIATION OF CONSULTING ENGINEERS, INC.*, has been recently organized and incorporated with headquarters in Syracuse. Officers are: *HOWARD F. ECKERLIN*, president and director; *JAMES N. DeSERIO*, vice president and director; *FRANK E. KULAS*, secretary-treasurer and director; *REALTO E. CHERNE, PAUL ROBSON*, and *DONALD BRILL*, directors.

▶ Construction of *DURO-DYNE CORP.'s* new plant and office building in Farmingdale, Long Island, has been completed. Room for future expansion of manufacturing, shipping, and receiving has been provided.

▶ *EUTECTIC WELDING ALLOYS CO., INC.* has established a new, modern warehouse service center to serve Los Angeles area industry. Service, testing, warehousing, and shipping space is provided in the new structure.

▶ *FOSTER WHEELER CORP.* will move its New York offices to the Tishman building, 666 Fifth Ave. The firm will occupy 240,000 sq ft on five floors of the structure.

DOMINANT
name in overhead heating is still . . .



SHAFCONAIRE®
THE ORIGINAL SUSPENDED FURNACE

Gas or oil-fired units designed especially for commercial and industrial installations

- ▶ Backed by 18 years of specialized overhead heating experience!
- ▶ Engineered for more efficient, more economical operation!
- ▶ Producing exclusively suspended type heating equipment!

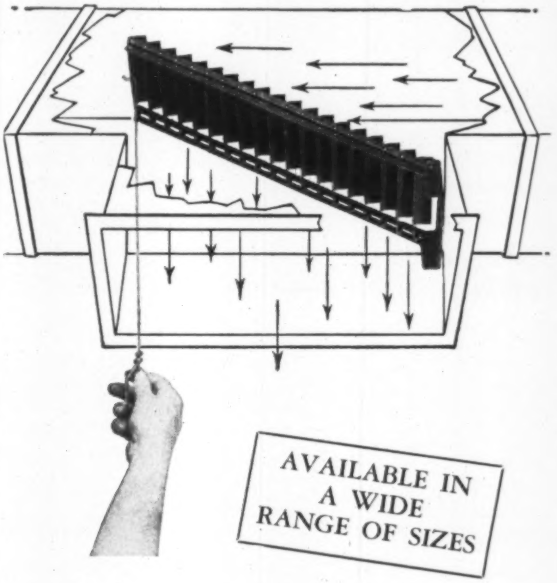
Models available for Gas or Oil from 95,000 to 405,000 B.T.U. output

Write or call for complete information today!

Up in the Air and out of the Way!
SHAFCONAIRE
OVERHEAD HEATERS

OverHead Heaters, Inc.
1612 BOOK BUILDING • DETROIT 26, MICHIGAN • WOodward 2-4647
Factory Location: Kalamazoo, Michigan

NOW... *Divert Air Where You Want It!*


AVAILABLE IN A WIDE RANGE OF SIZES

AIR "EXTRACTOR"

This new A-J Air Extractor gives you maximum control of any forced air system. It's not a "damper type" control to meter *available* air flow through a grille, but a "scoop" that diverts air from the main duct to branch ducts or grilles and *increases* output over normal flow where needed.

The curved steel blades of the A-J Extractor are adjustable and act in unison to provide a controlled and uniform flow of air into branch ducts. A single key rod provides fast and easy adjustment through the face of a grille or register, and eliminates need for removal. The extractor is sturdily constructed, and fastened in the duct with two screws. Velocity of the air will not alter setting. Write for full information and prices.

FREE CATALOG

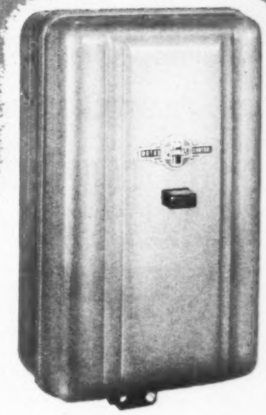
listing, describing and pricing 1,000 types and sizes of grilles, registers, etc.

A-J MANUFACTURING CO.

Dept. H-1

3601 E. 18th St. Kansas City 27, Mo.

SAVE 2 WAYS WITH FURNAS "In Between" STARTER SIZES



LOWER COST—save up to 25% by buying the exact size starter for the job, instead of having to take a standard one that may be too large.

LESS SPACE—save up to 40% by selecting a compact starter of a size designed to fit your requirement.

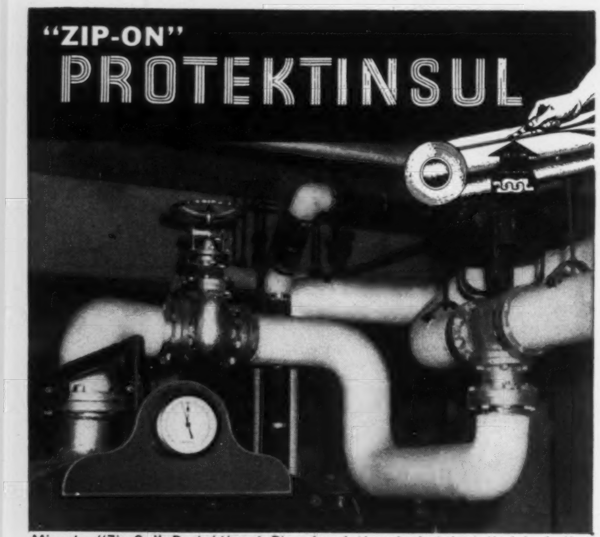
Furnas offers you 10 Magnetic Starter sizes instead of the usual five—5 standard and 5 "in-between" sizes. The "in-between" sizes allow you to choose the control that is exactly suited for your particular job when a standard size is not quite right. No need to waste money or space on a starter that is too large.

For information on our complete line of air conditioning and refrigeration controls, write for Bulletin 5519. Furnas Electric Company, 1041 McKee Street, Batavia, Ill.

A31

FURNAS 75th YEAR

FURNAS ELECTRIC COMPANY
BATAVIA, ILLINOIS
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES



"ZIP-ON"
PROTEKTINSUL

Miracle "Zip-On" Protektinsul Pipe Insulation Jacket installed in boiler room of Esso Bayway Community Center, Elizabeth, N. J.

Easy "Zip-On" installation ■ No maintenance painting ■ Excellent appearance ■ Non-inflammable ■ Chemical and mildew proof ■ Perfect vapor barrier.

FREE: Colorful, illustrated PROTEKTINSUL brochure, no obligation.

MIRACLE ADHESIVES CORPORATION
250 Pettit Avenue Bellmore, L. I., N. Y.

WE HEAR THAT

Continued

▶ General offices and the manufacturing plant of *WILKINS REGULATOR CO.* are now located at 2031 E. 27th St., Los Angeles. An additional 10,000 sq ft of property will house expanded service, sales, and manufacturing facilities together with inspection and test controls. The firm manufactures water pressure regulators.

▶ Two firms, *J. O. ROSS ENGINEERING CORP.*, including its subsidiaries, and *MIDLAND STEEL PRODUCTS CO.* recently merged. The combined, new organization is known as *MIDLAND-ROSS CORP.* with headquarters in Cleveland.

▶ With additional insulating materials now represented by the *MAGNESIA INSULATION MANUFACTURERS ASSOCIATION*, the name of the organization has been changed to *MAGNESIA-SILICA INSULATION MANUFACTURERS ASSOCIATION.*

▶ *TIPPTRONICS, INC.*, formerly located at Tipp City, Ohio, has transferred operations to Chagrin Falls, Ohio, in the greater Cleveland area.

▶ A New York sales office for *FARR CO.* has been established at 51 E. 42nd St.

for dependable ventilation . . .

specify PENN when you specify VENTILATORS

There is a type, size and capacity for all your ventilating requirements among the complete Penn Ventilator line. Efficient and economical, Penn Ventilators are easily installed and last long, providing years of trouble-free, inexpensive ventilation. They have been removing dust, vapors, smoke, heat, fumes and odors from public, commercial and industrial buildings for more than a quarter of a century.

Write for descriptive literature on the entire line . . . and qualified recommendations, prompt quotations.

Manufacturers of: Propeller Fan — Centrifugal Fan, Stationary, Rotary and Ridge Roof Ventilators and accessory products. Representatives and distributors in principal cities.

PENN VENTILATOR CO.
Member of PFMA and AMCA

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North Goodman St. & Allegheny Ave.
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FOR MORE THAN 25 YEARS THE BUILDERS' roof TOP LINE . . .

21 PACKAGED SIZES

AURORA® *Centri-Pac*

TYPE B CLOSE-COUPLED PUMPS

A comprehensive line of outstanding performers quickly available for a wide variety of important duties.

MOTOR SIZES
1/6 HP to 5 HP

CAPACITIES
to
150 GPM

HEADS
to
140 FT.

RANGE
from
3/4" x 1"
to
1-1/2" x 2"

LOW
NPSH

APPLICATIONS

CENTRI-PAC pumps are ideal as an integral part of original Equipment Manufacturer's product such as air conditioning units, cooling towers, evaporator coolers, milk coolers, hot water circulators etc., also for general service.

Here's WHY *Centri-Pacs* Deliver MORE

STUFFING BOX — Mechanical seal only.

SPEEDS — 3,500 RPM single and three phase.

VOLTAGE — ½ HP and larger are dual voltage.

MOTORS — 1/6 to 5 HP drip-proof NEMA standard. All 1½ HP and smaller, single phase, have overload protection built in.

LOW NPSH — Designed to meet critical suction conditions.

COMPACT — Space saving combines with ruggedness and high quality.

QUIET — Smooth running with controlled noise level.

ECONOMICAL — High efficiency insures power savings.

CONSTRUCTION — Bronze fitted only.

SHAFT — Stainless steel motor shaft.

SEALS — Stainless steel parts — high quality carbon stationary seal ring — minimum of rubber for best performance on hot liquid applications.

IMPELLER — Advanced design — exactly balanced for smooth, quiet operation — all for peak performance.

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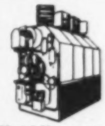
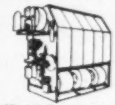
AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
80 LOUCKS STREET • AURORA • ILLINOIS
EXPORT DEPARTMENT—Aurora, Illinois—Cable Address "NYABINT"

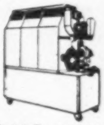
SEND TODAY FOR LATEST HEATER DATA



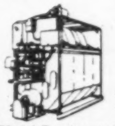
Model H — vertical unit with discharge heads. 12 sizes



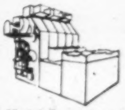
Model D — vertical unit for duct work. 12 sizes



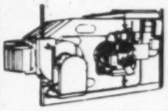
Model P — portable, vertical unit for flexible duty. 6 sizes



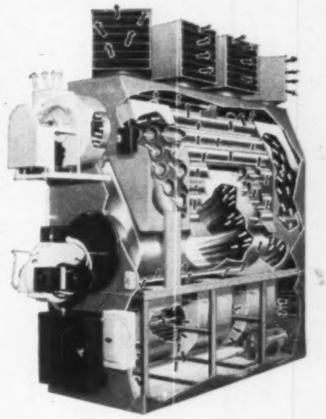
Model R — inverted unit with discharge heads at bottom 12 sizes.



Model S — vertical unit with side blowers to permit proper location of air mixing dampers. 12 sizes.



Model C — horizontal ceiling suspension unit for space saving. 12 sizes.



Tempering Make-up Air? Drying? Space Heating?

Let National Heater Company show you how space heating and ventilating problems can be solved **efficiently** and **economically.** No matter how large or small a plant may be, National Champion Heaters **save** money on installation, operation and maintenance.

NATIONAL *Champion*
DIRECT FIRED HEATERS

6 Models 66 Sizes
400,000 to 3,000,000 BTU's

Automatic Operation
PLUS Year-Round VENTILATING!

Direct-fired for gas, oil and combination fuels. Approved by American Gas Association. Listed by UL

WRITE TODAY FOR A NEW 6-PAGE BROCHURE LISTING SPECIFICATIONS AND DIMENSIONAL DATA OF 1958 LINE OF NATIONAL CHAMPION HEATERS

NO OBLIGATION! MAIL THIS COUPON TODAY!

NATIONAL HEATER CO., Inc., 2475 Doswell Ave., St. Paul 8, Minn.

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We're interested in knowing more about National Heaters as noted below:

☐ Send additional material on the 1958 line.

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We're Specialists In

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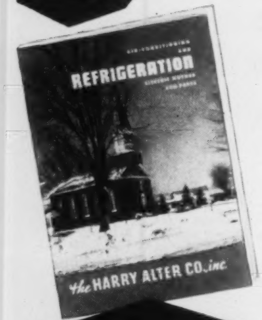

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122 Parkhouse St.
Atlanta 10, Ga.
690 Stewart Ave., S.W.

Free Parking and Fast Counter Service at these 4 Big Houses

WE HEAR THAT

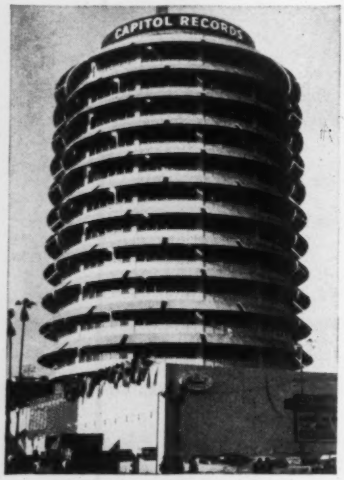
Continued

▸ All products of *UTILITY APPLIANCE CORP.* are being marketed and advertised under the single name of *GAFFERS & SATTLER*. The change became effective January 1.

▸ *AMERICAN BLOWER, DIV. OF AMERICAN STANDARD*, is conducting a commercial air conditioning training school program in Detroit. Fourteen one week courses are being offered, each including classroom and laboratory sessions.

▸ Courses pertaining to the design and installation of hydronic heating and cooling systems will be sponsored in 20 cities this year by the *INSTITUTE OF BOILER AND RADIATOR MANUFACTURERS*. Labor and material economy, design and calculation problems, and modern piping practices will be discussed at the sessions. Six courses to be conducted at universities will be held for four day periods; all others for three day periods.

▸ *KIRK & BLUM MFG. CO.* this year is celebrating its 50th anniversary. The company specializes in the design, fabrication and installation of dust collecting and fume removal systems for all types of industry. ⧺



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LOS ANGELES, CAL.

WELTON, BECKET & ASSOCIATES, ARCHITECTS-ENGINEERS, STATE PLUMBING & HEATING CO., MECHANICAL CONTRACTOR

Capitalize on

MILLER Streamflow CHECK VALVES

Completely Silences your piping system! CENTER-GUIDED, SHOCK PROOF, NOISELESS, ELIMINATES WATER HAMMER. FULL RADIAL FLOW.

SIZES 1" THROUGH 24".

FLANGED, ASA DRILLING, IBBM, CAST STEEL, ALL ALLOYS. FOR ALL FLUIDS AND GASES.

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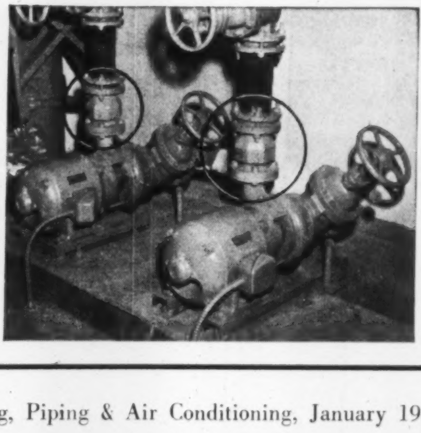

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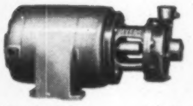
is your
business

YOU CAN DEPEND ON

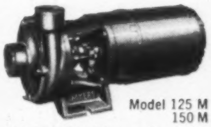
MYERS
centri-thrift pumps

designed especially for air conditioning and refrigeration cooling towers, booster service and coolant pumping in bulk milk coolers

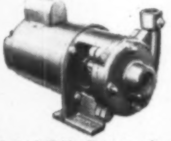
Ruggedly built for continuous duty, the general duty Myers Centri-Thrift features an all bronze impeller, removable wearing ring, and stainless steel shaft. The line offers a full range of sizes: from 1" x 1¼" through 2" x 2½" and from ⅓ to 7½ horsepower. Capacities to 240 GPM, heads to 140 feet.



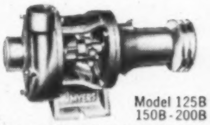
Model 150 M 200 M
Shown with rotary seal (available with stuffing box)



Model 125 M
150 M
Shown with stuffing box (available with rotary seal)

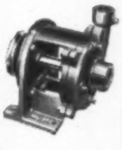


Model 100 M—Rotary seal only



Model 125B
150B-200B
Shown with stuffing box (available with rotary seal)

Model 100B
Rotary Seal
only



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THE F. E. MYERS & BRO. CO.
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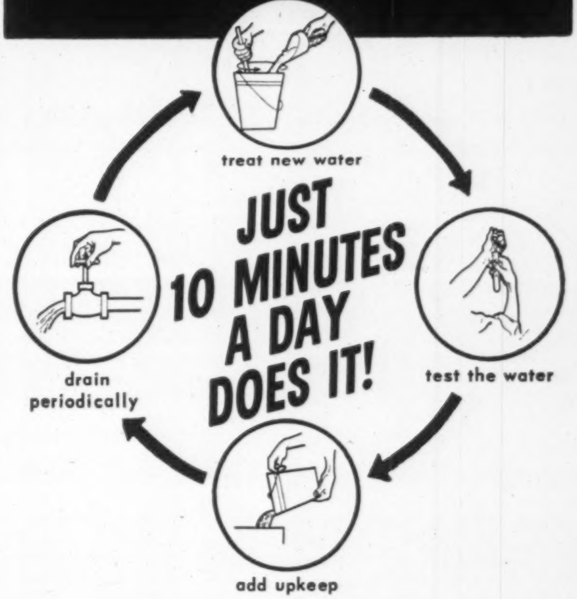
How to simplify
air conditioning system
water treatment



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Oakite Airefiner No. 52 leaves no deposit on tubes, is safe, and costs little for initial charge as well as upkeep.

Call in the local Oakite Technical Service Representative to get details and drawings on this money- and trouble-saving procedure. Or write Oakite Products, Inc., 32D Rector Street, New York 6, N. Y.

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Technical Service Representatives in Principal Cities of U. S. and Canada

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NEW IMPROVED FORMULA

ALWAYS PLIABLE IN CAN OR JOINT

KEY-TITE with special new ingredient is even better than ever—it's more pliable, has longer open-can life—gives permanent, leakproof sealing. It will not squeeze out of the joint and will not seize the joint.

Use **KEY-TITE** on water, gas, or low-pressure steam lines.

Seal it tight, seal it right with **KEY-TITE**. Order from your supply store or write for free sample.

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KEY-TITE
NEW IMPROVED FORMULA

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KEY-TITE is a registered trademark of acf Industries, Incorporated

MEETINGS & CONVENTIONS

1958

JAN. 20-21—*Compressed Gas Association, Inc.*, 45th annual meeting. Waldorf-Astoria, New York. CGA headquarters: 11 W. 42nd St., New York 36.

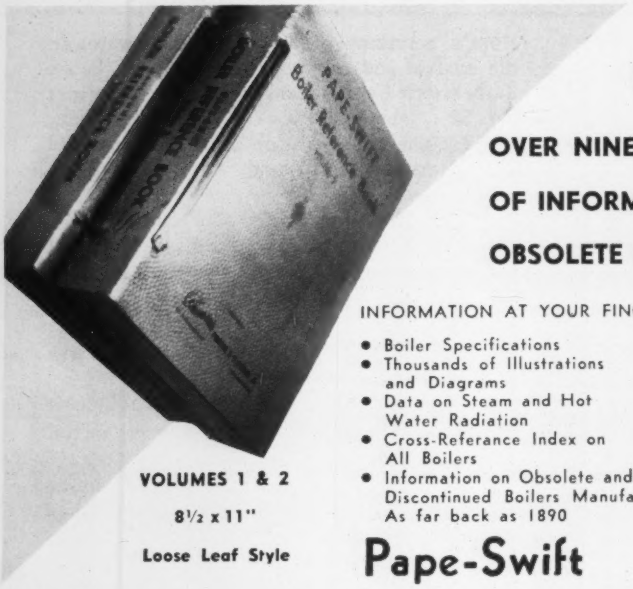
JAN. 27-29—*American Society of Heating and Air-Conditioning Engineers, Inc.*, 64th annual meeting. Penn-Sheraton Hotel, Pittsburgh. Information: A. V. Hutchinson, executive secretary, ASHAE, 62 Worth St., New York 13. Meeting program on page 231.

JAN. 27—*Illini Dinner* for Univ. of Illinois Alumni in heating and air conditioning. Penn-Sheraton Hotel, Pittsburgh, 6:30 p.m. Information: S. I. Rottmayer, Room 1106, 6 N. Michigan Ave., Chicago 2.

JAN. 27-30—1958 *Plant Maintenance and Engineering Show.* International Amphitheater, Chicago. Management: Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

FEB. 3-4—*Instrument Society of America,* national conference on progress and trends in chemical and petroleum instrumentation. Wilmington, Del. ISA headquarters: 313 Sixth Ave., Pittsburgh 22.

FEB. 3-6—*Summer-Winter Air Conditioning Short Course,* seventh annual session. Student Union Bldg.,



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FUMES, HEAT AND DUST
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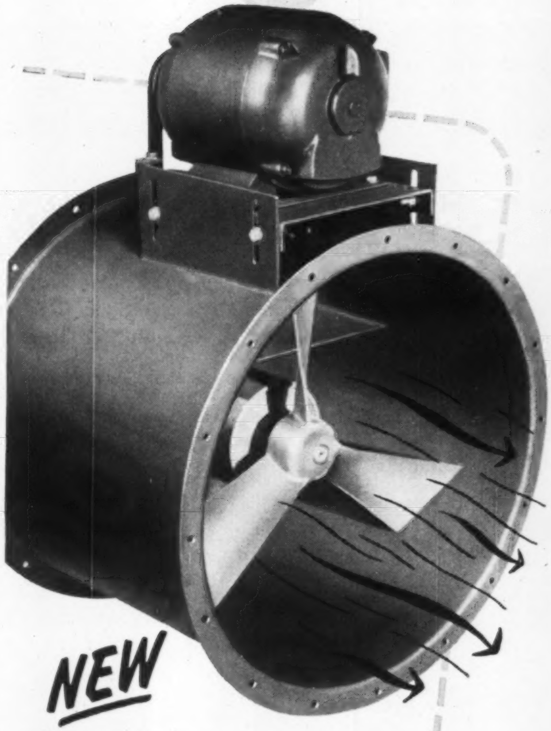


NEW

PROPELLAIR®

belt driven Tubeaxial Fans

Type "BT" Propellair Fans can be purchased and operated at low cost to handle difficult atmospheres such as highly corrosive, explosive, inflammable, grease or dust-laden air. Straight-line design permits easy, inexpensive installation. Platforms and duct elbows are eliminated. The externally mounted Robbins & Myers motor, sealed cast iron housed bearing assembly, air-tight drum and belt-tube provide complete protection. Standard models can handle temperatures up to 450° F. Propellair "BT" tubeaxial fans are available in sizes 16" to 60" for from 2000 to 85000 CFM air delivery.

WRITE FOR BULLETIN NO. 620-HP

R&M **PROPELLAIR®**

DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO

Certified Ratings

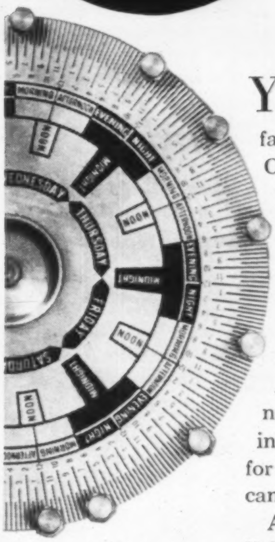
MAN COOLER
SKY-BLAST
VANEAXIAL
EXTENDED SHAFT

MOVING AIR IS OUR BUSINESS

All set to save on fuel bills

any day, any night, all week!

PARAGON
700 SERIES
7-DAY CALENDAR DIAL
TIME SWITCH



Dial is graduated into hours and half-hours. Fourteen dial trippers supplied. Available in 24, 120 and 240 volts; 25, 50 and 60 cycles. Lists as low as $29.50. Order from your jobber.

Write for information on the Paragon 2900 series to solve your off-schedule heating problems.

Turns heating equipment off when not needed

YOU can't beat the 700 series for promoting customer satisfaction through lower fuel bills! Once installed, it automatically turns heating systems ON as needed — turns them OFF during non-working-hours.

An entire week's program can be set in advance. ON-OFF can be programmed to any irregular daily schedule. Any day or days can be eliminated entirely. Monday morning ON can be earlier than usual for week-end pick up. Operations can be as close as 3 hours.

Air conditioning, ventilating, lighting, flushing, pumping and other operations can also be controlled on a weekly schedule with this 7-day time switch.

TODAY — Write for "Time is Money" — new Paragon handbook for you and your crews. Twenty pages of money-making ideas and handy application chart. Address Dept. 1311

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TWO RIVERS, WISCONSIN

CORROSIVE GASES
CHEMICAL FUMES
DUST
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THE WORLD'S MOST EFFICIENT POWER EXHAUSTER FOR INDUSTRY

. . . FOR INSTITUTIONS

. . . FOR RESIDENCES

★ STATIC PRESSURE UP TO 12 INCHES

★ NO MOTORS, FANS OR BEARINGS IN EXHAUST LINE

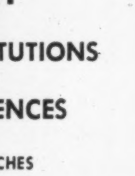
★ NEEDS NO STACKS ★ ACID RESISTING FINISHES

FOR INDUSTRY, Quickdraft provides up to 12 inches static pressure to **exhaust** paint spray, abrasives, corrosive gases, noxious fumes and high temperatures . . . **move** grains, powders, salts and trimmings . . . **recover** metallic waste from foundry stacks. It reduces maintenance costs . . . eliminates down-time for cleaning and replacing fan blades.

For INSTITUTIONAL AND COMMERCIAL BUILDINGS, Quickdraft eliminates costly, tall and unsightly stacks. It vents incinerators, heating plants and water heaters at roof level . . . safely and efficiently.

For RESIDENCES, Quickdraft maintains constant draft for efficient and economical combustion of all fuels. It keeps chimneys dry. It eliminates pulsating or chattering, puffing, smoking and sooting.

Write for QUICKDRAFT ENGINEERING DATA on your application . . . today.



N-587-QD

IMPORTANT NOTICE
For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel. No. 316 Stainless Steel, rigid plastics (P.V.C.), and with plastic and Fiberglas coatings.

Quickdraft CORPORATION

P. O. Box 87-K
Dueber-Hampden Bldg.
Canton 1, Ohio

MEETINGS & CONVENTIONS

Continued

1958

Oklahoma State University, Stillwater, Okla. Information: Glen Yandell, Box 100, Tulsa.

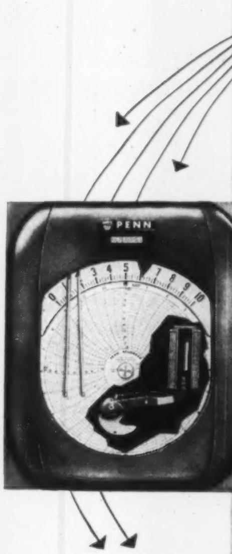
FEB. 4-6—*Society of the Plastics Industry, Inc.*, 13th SPI reinforced plastics division conference. Edgewater Beach Hotel, Chicago. SPI headquarters are at 250 Park Ave., New York, 17.

FEB. 17-20—*Seventh Annual Industrial Ventilation Conference.* Kellogg Center, Michigan State University, East Lansing, Mich. Information: Industrial Ventilation Conference, Continuing Education Service, Michigan State University, East Lansing, Mich.

MARCH 1—*Association for Applied Solar Energy*, first junior solar symposium. Arizona State College, Tempe, Ariz. AASE headquarters: Suite 202, Central Plaza Bldg., Phoenix, Ariz.

MARCH 17-21—*National Association of Corrosion Engineers*, annual conference and exposition. Civic Auditorium, San Francisco. NACE headquarters: 1061 M & M Bldg., Houston 2.

MARCH 17-21—1958 *Nuclear Congress.* Interna-



Write for Bulletin No. 1032

Responds to Changes of one part in 2000 or less!

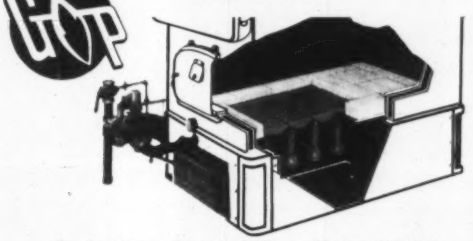
Burgess-Manning Electronic Flow Meters offer you this new high in sensitivity and speed of response for transmitting pressure differentials (for flow measurement), pressures, or actual motions. They are normally calibrated to 20% of maximum, but are available to 10% calibration of maximum flow on special order. Can be furnished with any combination (up to four) of flow, temperature and pressure pens. They feature extreme design simplicity and rugged construction, insuring a long dependable service life with minimum maintenance.

Send us an outline of your application for specific recommendation.

BURGESS-MANNING COMPANY
PENN INSTRUMENTS DIVISION
4108 Haverford Ave., Philadelphia 4, Pennsylvania

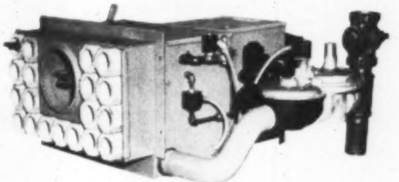
Instrumentation and Controls for water, steam, gases, sewage and industrial wastes

*"Planned Performance"**
BURNERS



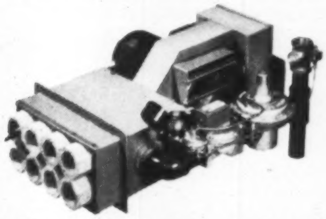
For heating and power boilers. 23 sizes listed in Catalog No. A-10.

BLUE LINE UPSHOT ATMOSPHERIC GAS BURNER



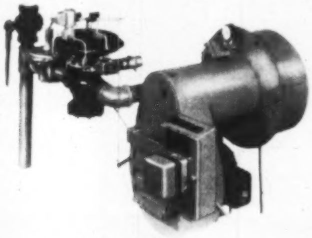
Retracted oil nozzle on gas firing. Sizes up to 30 GPH light oil. Catalog E-30.

DUO-FLAME COMBINATION GAS-OIL BURNER



Fully automatic, forced draft. Sizes listed to 28 million BTU/HR in Catalog C-10.

TURBO-FIRE POWER TYPE GAS BURNER



No stack required on boilers equipped for pressure firing. Sizes up to 10 million BTU/HR in Catalog C-15.

SCOTCH MARINE TYPE FGR PRESSURE BURNER

* PLANNED — Factory assembled, pre-wired for "Bolt-in" installation.

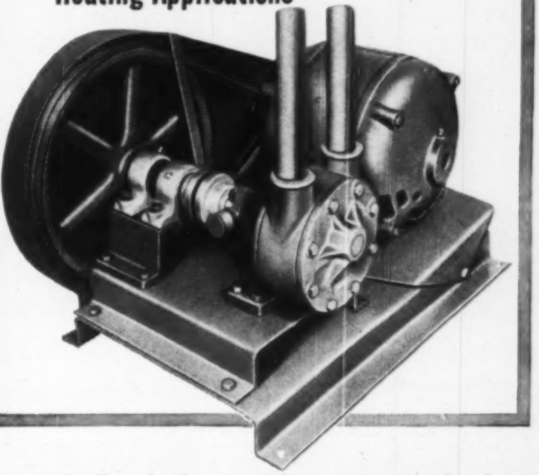
* PERFORMANCE — Custom matched to individual boilers for quiet, efficient operation.

Gordon & Piatt also manufacturer of a complete line of domestic conversion burners plus large dual-fuel units. Write for literature and complete information.

Gordon & Piatt
P. O. Box 914
Winfield, Kansas

new TUTHILL SU PUMP UNIT

- **For Handling Heavy Fuel Oils**
- **In Packaged Boiler and Commercial Heating Applications**

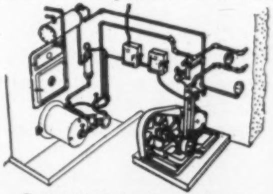


Economically priced, TUTHILL'S SU PUMP UNIT has been specifically developed for handling heavy fuel oils in commercial heating applications and with packaged boilers.

This "v" Belt Driven Unit is compact—complete units measure only 24¼" x 14⅝". Quiet operation is insured by the 2 or 4 "v" Belt Drive and the integral gear positive displacement pump design.

Construction features which provide dependable trouble-free operation, lower maintenance costs, include two ball bearing pillow blocks, one point take-up for simple adjustment of belt tension, removable belt guard and new fabricated steel base with versatile motor mounting.

SU PUMP UNITS can be furnished with a wide variety of pumps and motors for pressures up to 300 psi, capacities to 2030 gallons per hour. Sub-assemblies of pump, stub shaft, pillow block and sub-base are also furnished separately as a unit for incorporation into systems by boiler and furnace manufacturers. Write today for complete information.



Typical Application of SU Unit

TUTHILL PUMP COMPANY
947 East 95th Street, Chicago 19, Illinois
Gentlemen:
Please forward Catalog describing Tuthill SU Pump Units.
NAME________ COMPANY________
TITLE________
STREET________
CITY________ STATE________

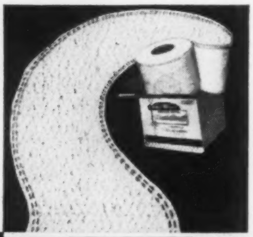
TUTHILL PUMP COMPANY
947 East 95th Street, Chicago 19, Ill.
Canadian Affiliate: Ingersoll Machine & Tool Company, Ltd., Ingersoll, Ontario, Canada

PUMPS FOR YOUR PURPOSE

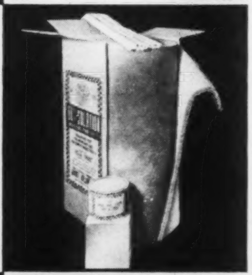
THESE
Grant Wilson
PRODUCTS

Complete the job...give it that *"custom"* look...that extra measure of efficiency!

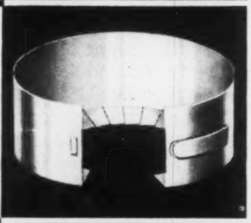
FLEXI-DUCT...
The original flexible asbestos duct connector that stops *more* noise, costs little, installs easily. Meets National Board of Fire Underwriters' requirements.



DUX-SULATION...
The duct insulation specified when nothing but the best procurable is desired—costs more and worth it. A complete package—maximum efficiency, lifetime service.



PIPE COVERING PROTECTOR CUPS...
The all-aluminum adjustable cup that protects exposed ends of pipe covering—the finishing touch on all pipe insulating jobs



VIBRA-STOP..
Type A (asbestos) and Type C (canvas)—both punch-lock sealed to No. 1 prime galvanized metal. Underwriters' grade asbestos and canvas meets Fed. Specs. MIL-C-4177 and MIL-D-10860. Both 24 and 26 gauge metal. 25, 50 and 100 foot rolls.

Grant Wilson inc.
ASBESTOS and INSULATING MATERIALS

141 W. JACKSON BLVD., CHICAGO 4, ILLINOIS

1958

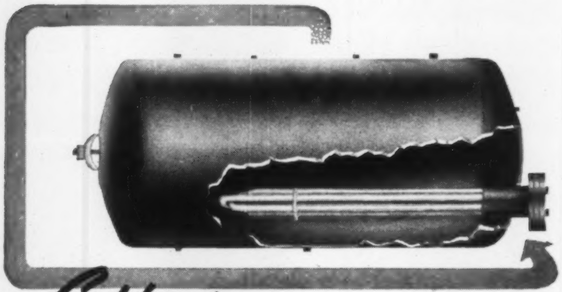
tional Amphitheater, Chicago. Information: Engineers Joint Council, 29 W. 39th St., New York 18.

MARCH 26-28—*American Power Conference*, 20th anniversary meeting. Hotel Sherman, Chicago. Sponsored by Illinois Institute of Technology. Information: R. A. Budenholzer, conference director, Mechanical Engineering Dept., Illinois Institute of Technology, 3300 Federal St., Chicago 16.

MARCH 31-*APRIL* 2—*Gas Appliance Manufacturer's Association*, annual meeting. The Greenbrier, White Sulphur Springs, W. Va. GAMA headquarters: 60 E. 42nd St., New York 17.

MAY 4-7—*Air-Conditioning and Refrigeration Institute*, annual meeting. The Homestead, Hot Springs, Va. ARI headquarters: 1346 Connecticut Ave., N. W., Washington 6, D. C.

MAY 7-11—*Western Air Conditioning, Heating, Ventilating and Refrigeration Exhibit and Conference.* Shrine Exposition Hall, Los Angeles. Sponsored by Western Air Conditioning Industries Association. Information: Fred J. Tabery, exhibit manager, 3443 S. Hill St., Los Angeles 7.



***Efficiency* is a must in your HOT WATER GENERATOR**

TANKS
SMOKESTACKS
PIPING
WATER HEATERS
BREECHING
PLATE WORK
BOILERS

Here is a Hot Water Generator that will give you the maximum in efficiency! *More* hot water at *less* operating cost. Quality of constructions is your assurance of the maximum operating efficiency from your FINNIGAN equipment. Adaptable to any type operation—built to your specification in capacities from 66 to 5,000 gallons, FINNIGAN Hot Water Generators are made from the finest material and contain copper removable-coil heating element. They are equipped with large size tappings which can be bushed to fit any job.

Call, wire or write today for further information . . . there is no obligation.

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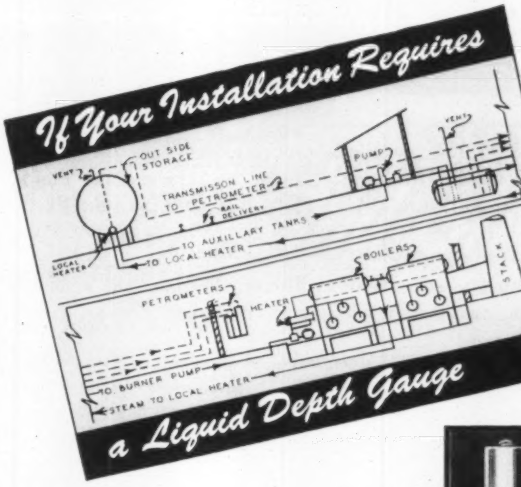
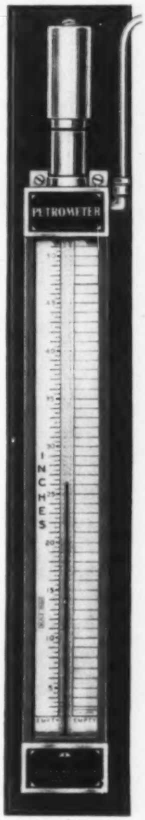

If Your Installation Requires
VENT
OUT SIDE STORAGE
TRANSMISSION LINE TO PETROMETER
RAIL DELIVERY
PUMP
VENT
TO AUXILIARY TANKS
TO LOCAL HEATER
LOCAL HEATER
BOILERS
STACK
PETROMETERS
HEATER
TO BURNER PUMP
TO LOCAL HEATER
STEAM TO LOCAL HEATER
a Liquid Depth Gauge


PETROMETER
INCHES

Specify:

PETROMETER

REMOTE READING

TANK GAUGES

THE BEST GAUGE FOR:

Commercial and Industrial Fuel Oil Tanks

Domestic Installations with Buried Tanks

Storage Tanks for other liquids—gasoline, solvents, acids, etc.

Here's Why:

No troublesome moving parts—operates on the sound principle of the U-tube. Simple, dependable and accurate.

Large, easy-to-read vertical scale gives tank contents at a glance. Eliminates the cumbersome measuring stick and the inconvenience of climbing the tank.

Installation is easy—gauges can be installed on tanks above or below ground level and up to ¼ of a mile away. The tank assembly for the gauge can be installed even when the tank contains liquid. It can also be fitted in the tank separately to complete the tank work. The gauge can be connected any time later. Just tighten one simple connection and the job is finished.

5

FOR TANKS 20 INCHES TO 50 FEET DEEP. ***Write for Bulletin PH.***

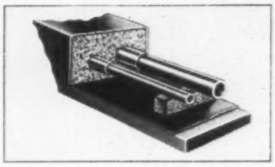
Petrometer
CORPORATION
43-22 TENTH ST., LONG ISLAND CITY 1, N. Y.

THE BIG NEWS IS OUT!

NOW! ...there's a custom-built underground

"Z"crete®

hot pipe insulating system for **your** need!

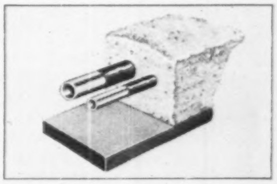


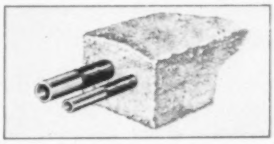
some jobs need

the supporting base pad and waterproofing envelope system... has strength, load bearing, and extreme water protection for bad ground and water conditions.

some jobs need

the base pad system. Provides a continuous stable base in uncertain soil, undependable fill ground conditions, when average water table level is below the bottom of the conduit.





some jobs need

the b-t-u system. No base pad or external waterproofing. For use where ground is uniform and stable and average water table level is below bottom of conduit.

...and Z-crete has them all!

Now you may choose a reliable Z-crete System for ANY size job, ANY sub-surface condition. Z-crete installations are made by authorized, trained applicators, licensed under Z-crete patents (U.S. #2355966, Canadian #439356). Continuing research and field tests have greatly extended the applicability of the Z-crete System. New blends of portland cement and admixes, and new structural methods, provide even greater water resistance, thermal values and structural strength.

FOR EASY DESIGN AND SPECIFICATION MAIL COUPON, GET TESTED DATA

ZONOLITE COMPANY, **Z-crete Div., Dept. HPAC-18**
135 S. LaSalle St., Chicago 3, Ill.

Send me Z-crete data folders Z-1 and Z-12.

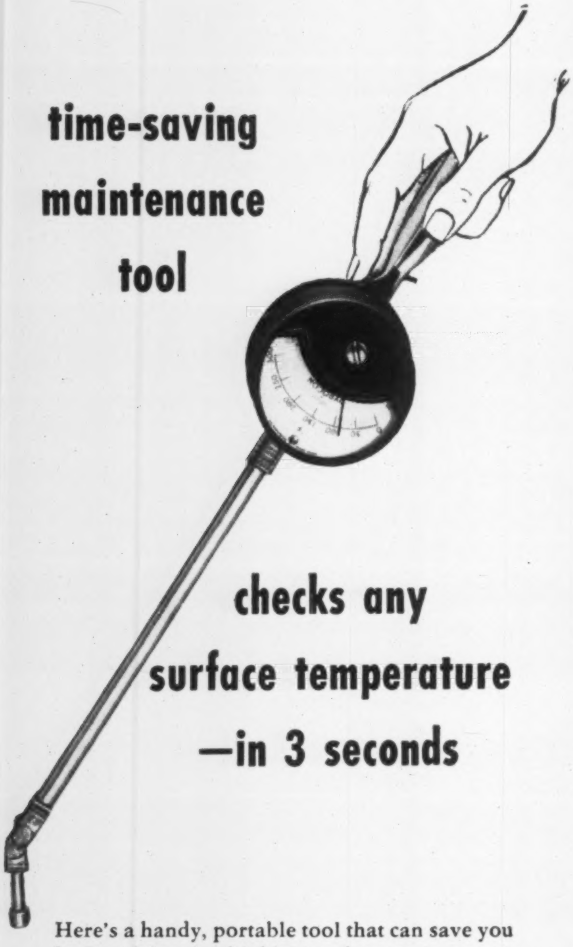
*Name*____________________

*Firm*____________________

*Address*____________________

*City*__________ *Zone*____ *State*__________

INSTALLED BY LICENSED APPLICATORS



time-saving maintenance tool

checks any surface temperature —in 3 seconds

Here's a handy, portable tool that can save you hours of time in checking surface temperatures of steam traps, water lines, electric motors, bearings, etc.

The Alnor Pyrocon gives instant, accurate temperature readings of any surface: metallic or non-metallic, flat, curved—even revolving surfaces. It's a well-balanced instrument mounted in a sturdy case for protection against the usual hazards of on-the-job service. Jeweled movement is also heavy-duty, shock-resistant type that will withstand hard and continuous use...performing with laboratory accuracy.

A wide selection of thermocouples and extension arms assures its adaptation to your needs. Eight standard F. scale ranges are available up to 2000° F. Send for complete details contained in Bulletin 4257. Illinois Testing Laboratories, Inc., Room 513, 420 N. LaSalle St., Chicago 10, Ill.

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Alnor®

MEETINGS & CONVENTIONS

Continued

1958

MAY 11-14—*Fluid Controls Institute, Inc.* Lake Placid Club, Lake Placid, N. Y. Information: Fluid Controls Institute, Inc., P. O. Box 191, Decatur, Ill.

MAY 19-23—*National Fire Protection Association,* annual meeting. Palmer House, Chicago. The association is at 60 Batterymarch St., Boston.

MAY 20-23—*Mechanical Contractors Association of America, Inc.,* 69th annual convention. Ambassador Hotel, Los Angeles. Information: MCAA headquarters, 45 Rockefeller Plaza, New York 20.

JUNE 2-5—*National District Heating Association,* 49th annual meeting. French Lick-Sheraton Hotel, French Lick, Ind. Information: John F. Collins, Jr., secretary-treasurer, 827 N. Euclid Ave., Pittsburgh 6.

JUNE 9-13—*Fourth International Automation Exposition and International Automation Congress.* Coliseum, New York. Information: Richard Rimbach Assoc., 845 Ridge Ave., Pittsburgh 12.

JUNE 22-27—*American Society for Testing Materials,* annual meeting. Hotel Statler, Boston. Information: 1916 Race St., Philadelphia 3.

JUNE 23-25—*American Society of Heating and Air-Conditioning Engineers, Inc.* and *American Society of Refrigerating Engineers,* joint meeting. Hotel Leamington, Minneapolis. ASHAE headquarters: 62 Worth St., New York 13. ASRE headquarters: 234 Fifth Ave., New York 1.

AUG. 7-9—*North Carolina Hospital Engineers Association, Inc.,* 1958 convention. Sir Walter Hotel, Raleigh, N.C. Headquarters: Oteen, N. C.

SEP. 15-19—*Instrument Society of America,* 13th annual instrument automation conference and exhibit. Philadelphia. Information: Fred J. Tabery, 3443 S. Hill St., Los Angeles 7.

OCT. 5-8—*National Association of Corrosion Engineers,* technical session. Hotel Somerset, Boston. NACE headquarters: 1061 M & M Bldg., Houston 2.

OCT. 12-16—*American Gas Association,* annual convention. Atlantic City. AGA headquarters: 420 Lexington Ave., New York 17.

OCT. 20-24—*46th National Safety Congress & Exposition,* Chicago. National Safety Council, 425 N. Michigan Ave., Chicago 11.

OCT. 22-24—*Air-Conditioning and Refrigeration Wholesalers Association,* annual meeting. Sheraton-

SOUTH BEND
SOUTH BEND AIR PRODUCTS INC
INDIANA

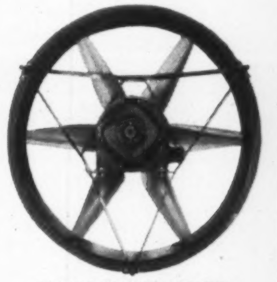
Fans FOR EVERY Industry

AEROSPOT *and* DYNAFLOW

Aerospot and *Dynaflow* fans rate high in efficiency and safety features . . . offer advanced aerodynamic design and rugged construction. The models shown enjoy wide popularity with industrial users. Any unit may be furnished with **explosion-proof** motor and fan blades.

HEAVY DUTY AEROSPOT

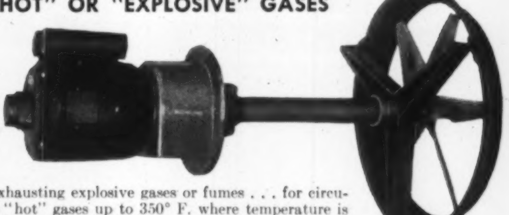
For general or specific ventilation, man-cooling, or parts-cooling . . . to increase personnel efficiency and reduce lost time in cooling and drying hot parts. Portable . . . direction of blast adjustable. Explosion-proof motor, metal conduit and starter can be supplied. Conforms to state safety regulations.



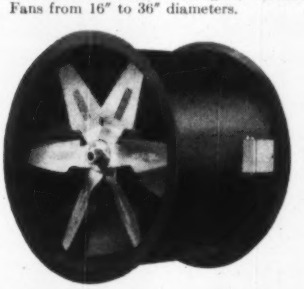
DYNAFLOW UNITS 2-4-6 BLADE TYPES

Six blade model illustrated. For exhausting or blowing against high static pressures. For general ventilation or specific processes where fumes are present. Sizes: 16" to 36" diameter. Capacities: 1240 to 26000 c.f.m. Two and four blade models available for applications at lower static pressures.

EXTENSION ARM DYNAFLOW FOR "HOT" OR "EXPLOSIVE" GASES



For exhausting explosive gases or fumes . . . for circulating "hot" gases up to 350° F. where temperature is too high to permit use of standard or even special motors. Used in heat exchangers, "sweater" ovens, etc. Fans from 16" to 36" diameters.



DUCTYPE UNITS

Direct Drive or Belt Drive

Direct drive model shown, also supplied with belt drive for high temperatures or corrosive air and gas handling. Designed for bolting in any duct run at any point or at either end. Sizes: 16" to 36" fans.

Send for complete specifications and listings of other fans available.

WRITE FOR CATALOG

SOUTH BEND AIR PRODUCTS, INC.
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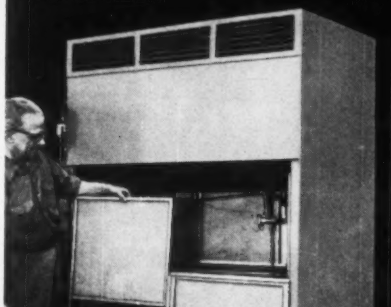
In filters— Polystyrene keeps air daisy-fresh!

Polystyrene is the miracle plastic found only in Dust-magnet air filters. This amazing material collects dust by electrostatic attraction—resists humidity, stands up under temperature changes. Only service required is rinsing in clear water. For customer satisfaction install Dust-magnets in all air conditioning and warm air installations. We're happy to answer any and all questions—write or call STODDARD INDUSTRIES, INC., 1545 Kingsbury Street, Chicago 22. Telephone MOhawk 4-1650

DUST-magnet

The lifetime filter that washes clean in a jiffy!



* A Product of
STODDARD
INDUSTRIES

MEETINGS & CONVENTIONS *Continued*

1958

Palace Hotel, San Francisco. Information: 2607 N. High St., Columbus, Ohio.

NOV. 17-21—*Society of the Plastics Industry, Inc.*, eighth national plastics exposition. International Amphitheater, Chicago. To be held concurrently with the SPI annual national conference, Morrison Hotel, Chicago. SPI headquarters: 250 Park Ave., New York 17.

DEC. 1-3—*American Society of Refrigerating Engineers*, semi-annual meeting. Hotel Roosevelt, New Orleans. Information: 234 Fifth Ave., New York 1.

DEC. 1-4—*National Warm Air Heating and Air Conditioning Association*, annual convention. Cleveland, Ohio. Information: 640 Engineers Bldg., Cleveland 14.

1959

FEB. 3-5—*Society of the Plastics Industry, Inc.*, 14th SPI reinforced plastics division conference. Edgewater Beach Hotel, Chicago. SPI headquarters: 250 Park Ave., New York 17. ⌖

for your convenience **SPRAY NOZZLES** and all related accessories for **HUMIDIFYING** from a single, dependable source

PRECISION PNEUMATIC ATOMIZING NOZZLES

ACCESSORIES SUCH AS AIR FILTERS, HUMIDISTATS, SOLENOID VALVES, PRESSURE REGULATORS

COMPACT HUMIDIFYING UNITS

For industrial installations of every size Spraying Systems offers all needed equipment . . . everything but the piping, wiring and compressor. Provides high efficiency, dependable system; only two components have moving parts. Engineered for easy installation and simplified maintenance.

WRITE FOR Bulletin 82 . . . spray nozzles, assemblies and parts for manual or automatic humidifying systems.

ALSO SUPPLIED . . . spray nozzles for evaporative condensers, air washers, cooling towers, spray ponds and roof cooling systems.

SPRAYING SYSTEMS CO.
3219 RANDOLPH STREET • BELLWOOD, ILLINOIS
ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

Write for new Bulletin!

WILSON CENTRIFUGAL BLOWDOWN SEPARATOR

SOLVES BOILER BLOWDOWN DISPOSAL PROBLEMS

Here is the safe, economical way to handle boiler blowdown . . . at atmospheric pressure. Steam flash is instantaneously cleared through the large top vent pipe. Water and sludge fall by gravity through bottom drain. No objectionable noise. Install where convenient, inside or out—even on boiler room roof. One Wilson Separator can handle two or more boilers in battery, if desired. Special models with flanged or butt welding connections available.

- MEETS REQUIREMENTS OF A.S.M.E. UNFIRED PRESSURE VESSEL CODE
- SIMPLE TO INSTALL
- REQUIRES NO MAINTENANCE
- THOUSANDS IN SERVICE

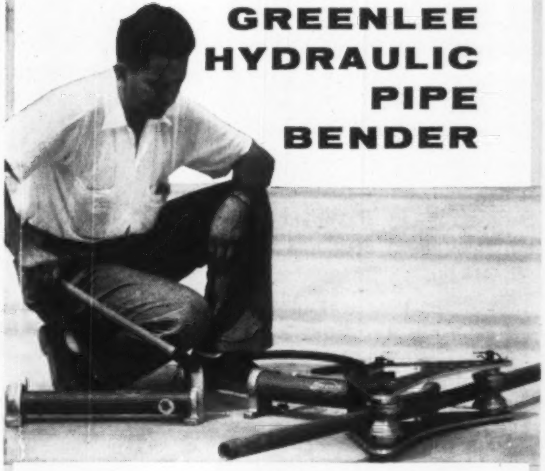
WILSON ALL-CAST ALUMINUM RADIATION ELEMENTS

. . . provide maximum heat transfer with minimum weight. Rugged construction with high resistance to corrosion or electrolytic deterioration. You gain these advantages in Wilson Aftercoolers, Unit Heaters and other radiation products.

WILSON ENGINEERING CORPORATION
6 North Michigan Avenue Dept. H-1 Chicago 2, Illinois

save time, cut costs on your piping installations with lightweight, portable

GREENLEE HYDRAULIC PIPE BENDER



easy, fast operation makes 90° bend with one ram stroke

Quickly produce your own bends in cold pipe *right on the job* . . . exactly the way you want them, to make a correct-working, neat-fitting installation. Save hours of time, save labor, eliminate cost of many manufactured bends and fittings with the GREENLEE No. 880 Hydraulic Bender for ½" to 2" pipe. Easily carried and operated by *one man*. Accurate . . . makes bends to just the angle required. Fast . . . *a complete 90° bend made with one ram stroke.* Radius attachment also available for making radiant heating 180° return bends in tubing and pipe. Powerful . . . 15 tons of ram force! Easily operated by hand, or may be teamed with a GREENLEE power pump for production-line bending either in your shop or out on the job. GREENLEE line also includes larger hydraulic benders for pipe up to 5" and hand benders for tubing and small pipe. Get the complete story on how you can speed your work, make better installations, and cut job costs with a GREENLEE Bender. Write for folder E-221.

TOOLS FOR CRAFTSMEN
GREENLEE

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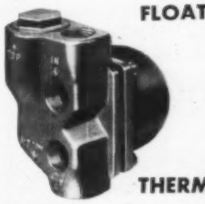
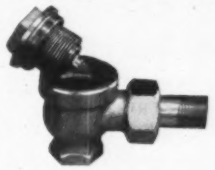
2341 12th Street, Rockford, Illinois

Sterlco® HEATING and TEMPERATURE CONTROL EQUIPMENT

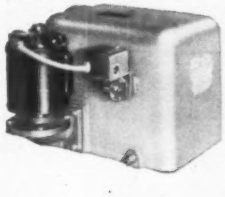
THERMOTROL (No. 120 Illustrated)
Self-contained individual radiator temperature controls for steam or hot water. Simple to install! Eliminate over-heating, save fuel. Maintain even temperature for comfort and health. Sizes: ½", ¾", 1". Body styles: Angle, Straightway, Corner.



FLOAT AND THERMOSTATIC TRAPS (69B F&T Trap Illustrated)
Compact, rugged, easy to service. "Vacuum thermostat" vents air, float valve has capacity for large amounts of condensate. Ideal for unit heaters. Sizes: ¾", 1", 1-¼", 1-½", 2". Max. Pressures: 20, 100 psi.



THERMOSTATIC RADIATOR TRAPS
Keep radiators clear of condensate and air, prevent steam waste. Dependable "Vacuum thermostat", sturdy brass bodies and covers, replaceable seats. Sizes: ½", ¾", 1". Max. Pressures: 15, 65, 100, 125 psi. Body styles: Angle, Straightway, Corner, Vertical.



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Neat, convenient unit with cast iron tank, dual voltage capacitator type motor, carbon-type rotary seal. Three sizes of pumps for low pressure jobs up to 15,000 sq. ft. E. D. R. and 20 lbs. pressure.
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3500 SERIES — Heavy duty — 2,000 to 65,000 sq. ft. up to 150 lbs. pressure.
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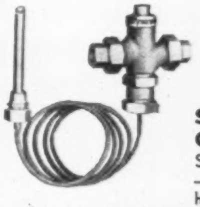

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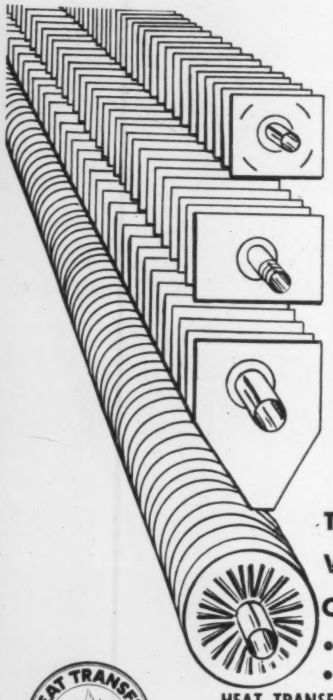

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NEW BOOKS & REPORTS...

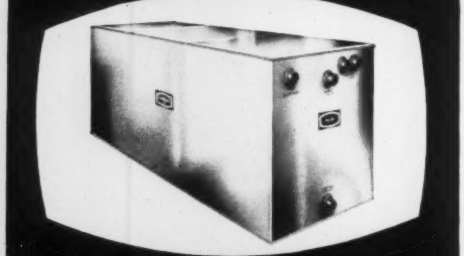
STANDARD FOR UNITARY AIR-CONDITIONING EQUIPMENT No. 210-57 — ARI publication. Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N.W., Washington 6, D. C. 35c.

ABSORPTION COOLING PROCESS — IGT research bulletin No. 14. By R. T. Ellington, G. Kunst, R. E. Peck, J. F. Reed. 48 pp. Institute of Gas Technology, Technology Center, Chicago 16. $5.00.

REFRIGERATION, AIR CONDITIONING, AND COLD STORAGE — By Raymond C. Gunther. 1220 pp. Chilton Book Div., 56th and Chestnut Sts., Philadelphia 39. $15.00.

STANDARDS ON COPPER AND COPPER ALLOYS — ASTM technical publication. 688 pp. American Society for Testing Materials, 1916 Race St., Philadelphia 3. $6.25.

THERMAL RESISTANCE OF AIRSPACES AND FIBROUS INSULATIONS BOUNDED BY REFLECTIVE SURFACES — By H. E. Robinson, L. A. Cosgrove, F. J. Powell. 22 pp. Building Materials and Structures Report 151, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 20c.



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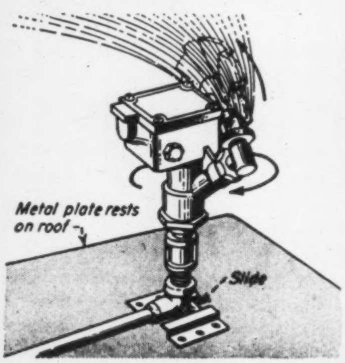
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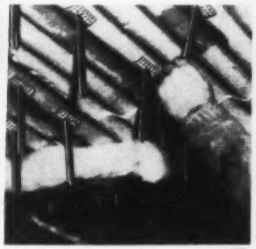

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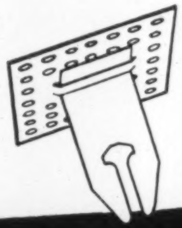

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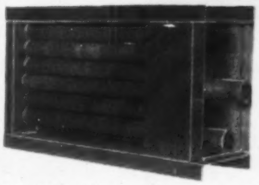

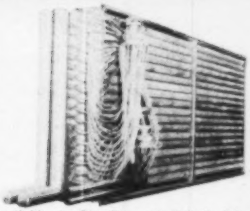

Helical fin, solder bonded to ⅝ O.D. copper tube with copper or aluminum fins, 3, 7, or 8 fins per inch. Also available in ⅜, ⅞, and 1-⅛" O.D.

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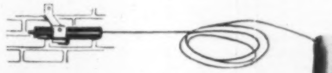
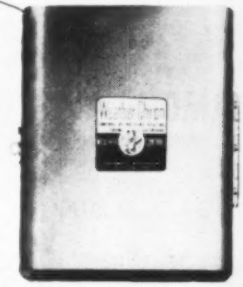
Now makes pneumatic or electric heating control systems FULLY AUTOMATIC





Outguesses the weather!

The time of shift from *night* to *day* thermostat changes automatically with every degree change in outdoor temperature. The WEATHER-CHRON has a temperature-sensitive bulb like that of an indoor-outdoor thermometer which is placed outdoors where it constantly measures outdoor temperatures. Instead of just showing what the outdoor temperature is, the WEATHER-CHRON

Changes the time heating starts as outside temperatures change.

Permits the thermostat (all types) to control heat flow during the day.

Stops heat flow as outdoor temperatures rise above 65° F.

Shuts down heating earlier in mild weather — later in cold weather

Turns heat back on at night when outdoor temperature drops below selected levels.

FOR YOUR PROTECTION, AND IN THE BEST INTERESTS OF YOUR CLIENTS

Write for complete model information

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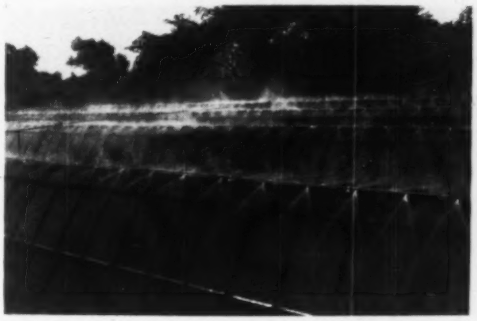

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- **Prolongs life of roof.**

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For design purposes allow 200 sq. ft. to one gallon of water — Daily water requirement about 200 gal. per 1,000 sq. ft.

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NEW BOOKS & REPORTS

Continued

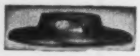
TENTATIVE SPECIFICATIONS FOR COPPER AND COPPER-ALLOY ARC-WELDING ELECTRODES — AWS, ASTM publication. 16 pp. American Welding Society, 33 W. 39th St., New York 18, and American Society for Testing Materials, 1916 Race St., Philadelphia 3. 40c.

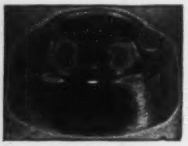
ELECTRIC HYGROMETERS — NBS publication. By Arnold Wexler. 22 pp. Circular 586, National Bureau of Standards, Office of Technical Information, Washington 25, D. C. 20c.

AIRCRAFT PENALTY METHODS AND SYSTEM COMPONENTS CHARACTERISTICS — Part Two of *Equipment Cooling Systems for Aircraft.* By R. H. Zimmerman. 193 pp. Order PB 121234, Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $4.00.

BURNER FUEL OILS — Third annual survey report. 32 pp. Order No. 8631, Bureau of Mines, United States Dept. of the Interior, Washington, D. C.

SPECIFICATION FOR COPPER AND COPPER ALLOY WELDING RODS — AWS technical report. American Welding Society, 33 W. 39th St., New York 18. 40c ⧧


No. 1
Made solid only
Flat Type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Made split or solid
Clears sleeve 1″ high

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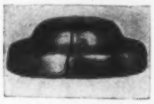
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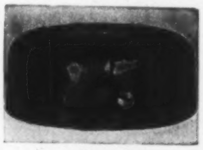
Clears sleeve 1/4″ high


No. 7
Made in two halves. Held by two screws. All dimensions to specifications.

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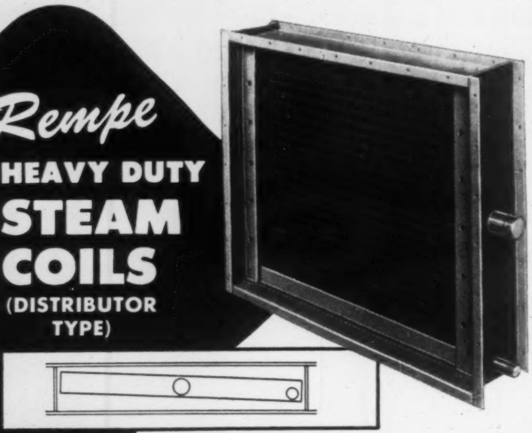
HEAVY DUTY
STEAM
COILS
(DISTRIBUTOR TYPE)



Tilted feature assures drainage of condensate whether used for vertical or horizontal air flow.

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Cover pieces at header and stub ends are perforated to allow passage of measured amount of by-pass air —gives increased coil capacity—eliminates hot end stress. Every square foot of face area produces equal heating capacity on full or modulated steam supply. Two row or one row available. ***Write for details***

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Founded 1890

REMPE COMPANY
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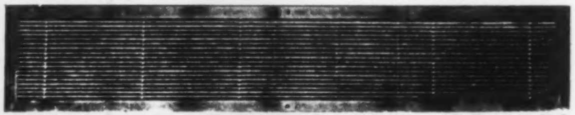

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Excellent opportunity investigating Domestic Burner Equipment and Fuels. Studies concerned primarily with Mechanical Factors Influencing Burner operation. Socony Mobil Oil Company, Inc., Technical Service Laboratory, 412 Greenpoint Avenue, Brooklyn 22, New York.

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Challenging opportunity in rapidly expanding company for engineer with five or more years experience in the design of air conditioning and refrigeration systems.

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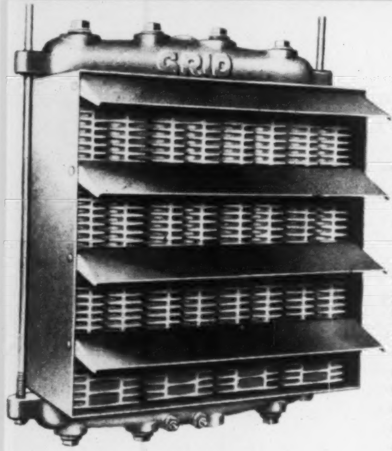
GRID

CAST IRON STEAM HEAT TRANSFER SURFACE

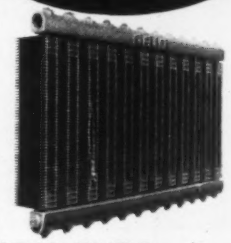
UNIT HEATERS BLAST HEATERS RADIATORS

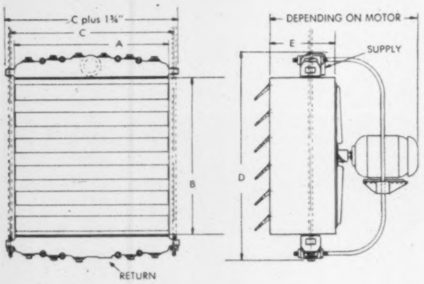
. . .one piece construction high test cast iron heating sections . . .



Trouble-free heating service since 1929

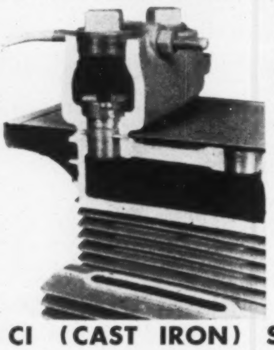
Your answer to unit heater problems general industries have discovered through common failures of copper, aluminum, and steel tube heat transfer surface. GRID condenser eliminates internal electrolytic corrosion—because all metals in contact with steam are similar. GRID also eliminates external corrosion —because the cast iron construction resists acid or other fumes in the air and eliminates the use of reducing valves where high steam pressure is used. GRID cast iron construction is tested to withstand steam pressures up to 250 P.S.I. . . . 450° temperature. GRID eliminates the high maintenance costs generally experienced with other types of condenser construction . . . eliminates replacement costs because GRID is built to last for years . . . uninterrupted service records of more than twenty years are common among GRID users in general industry.



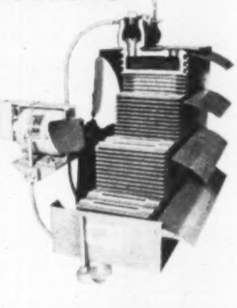


Overall dimensions for installation of Cast Iron GRID Unit Heater

GRID CAST IRON CONSTRUCTION ENDS UNIT HEATER MAINTENANCE PROBLEMS



All metals in contact with steam are similar . . . no soldered, brazed, welded or expanded connections . . . especially designed threaded nipple provides a leak proof joint (see illustration to left). GRID design gives you maximum heating performance . . . provides more air changes at lower outlet temperatures.



CI (CAST IRON) SERIES GRID UNIT HEATER DATA

Capacities at 60° F ENT Air 5 P.S.I. Steam

Model No.	Dimensions A	B	C	D	E	Motor HP	RPM	C.F.M.	Btu Hr	Final Temp °F	Pipe Size Supply	Return	Support Rod Dia	Approx. Net Shpg Weight
CI 1000	9¾	9$\frac{13}{16}$	11¾	15$\frac{9}{16}$	12¼	1/20	1550	570	29100	106	1¼	1¼	⅜	150
CI 1200	13	12$\frac{13}{16}$	15	18$\frac{9}{16}$	12¾	1/12	1750	800	45490	112	1¼	1¼	⅜	210
CI 1500	15⅜	16	17¼	24⅜	12	1/8	1750	1500	76650	106	1½	1½	½	280
CI 1520	15⅜	21	17¼	29⅜	12	1/8	1750	1700	101570	114	1½	1½	½	390
CI 2000	20½	21	22⅜	29	12	1/6	1150	2600	140700	109	2	1½	½	490
CI 2025	20½	26	22⅜	34	12	1/6	1150	2875	172100	114	2	1½	½	520
CI 2504	25¾	26	27½	35⅜	13	1/4	1150	3300	205800	117	2	1½	⅝	660
CI 2500	25¾	26	27½	35⅜	13	1/2	1150	4350	223130	106	2	1½	⅝	700
CI 2530	25¾	31	27½	40⅜	13	1/2	1150	4650	275630	114	2	1½	⅝	900
CI 3000	30⅞	31	32⅝	40⅜	13	1/2	850	5900	320250	109	2½	1½	¾	1020
CI 3000	30⅞	31	32⅝	40⅜	13	1½	1150	8000	380100	103	2½	1½	¾	1070

OFFICES IN PRINCIPAL CITIES

T.M. REG. U.S. PAT. OFF.

D. J. MURRAY MANUFACTURING CO.

WAUSAU, WISCONSIN

Write for complete catalog information on GRID Unit Heaters, GRID Blast Heaters, and GRID Radiation.

Section of January 1958 Heating, Piping & Air Conditioning

1958 DIRECTORY

Heating, Piping, and Air Conditioning Equipment for Industrial, Commercial, Institutional and Public Buildings

PART 1—Products Advertised In This Issue—Page 3d

Products advertised in this issue classified in "directory style." For pages on which advertising of manufacturers in this issue appears, see page 160d in this Directory Section.

PART 2—All Products Classified—Page 11d

All products classified alphabetically, along with names of manufacturers. (Arranged by noun governing; for example, "unit heaters" listed under "heaters, unit.")

PART 3—All Trade Names—Page 118d

Product trade names alphabetized, identified with names of manufacturers. Trade names the same as or identifiable from company names are not listed. Manufacturers with such trade names can be found under their product classifications in Parts 1 & 2.

PART 4—All Manufacturers' Addresses—Page 140d

Names and addresses of all manufacturers.

Heating, Piping & Air Conditioning
6 N. Michigan Ave.
Chicago 2, Illinois

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DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRIAL AND ALL OTHER LARGE BUILDINGS

PART 1—PRODUCTS ADVERTISED IN THIS ISSUE

The products classified in this Part 1 of the Directory Section are only those advertised in this issue. For the complete listings of these and other products made by all manufacturers, see Part 2, starting on page 11d. For the pages on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on page 160d of this yellow Directory Section.

ABSORBERS, SHOCK, LIQUID, TO ELIMINATE WATER HAMMER IN PIPING
Finn & Co., Inc., T.R.
Vibration Mountings, Inc.

ABSORBERS, SOUND, PREFABRICATED DUCT SECTION, FOR NOISE CONTROL IN DUCT SYSTEM
Hansson, Inc., Elof
Industrial Acoustics Co., Inc.
Industrial Sound Control Dept. of Koppers Co., Inc.

ABSORBERS, VIBRATION, FOR REFRIGERANT AND OTHER PIPE LINES
Finn & Co., Inc., T.R.
Korfund Co., Inc., The
Packless Metal Hose, Inc.
United States Rubber Co.
Vibration Mountings, Inc.

ACCUMULATORS, REFRIGERATION (for air conditioning)
Dole Refrigerating Co.

ADHESIVES, FOR INSULATION OTHER THAN PIPE
Moore, Inc., Goodloe E.
Swift & Co., Adhesive Products Dept.

ADHESIVES, FOR PIPE COVERING
Armstrong Cork Co.
Arno Adhesive Tapes, Inc.
Moore, Inc., Goodloe E.

ALARMS, HIGH & LOW BOILER WATER
McDonnell & Miller, Inc.
Reliance Gauge Column Co.

ALARMS, HIGH AND LOW FLOW, FOR PIPING SYSTEMS
McDonnell & Miller, Inc.

ALARMS, LIQUID LEVEL, AUDIBLE
McDonnell & Miller, Inc.
Reliance Gauge Column Co.

ALARMS, LIQUID LEVEL, VISUAL
Reliance Gauge Column Co.

BARRIERS, VAPOR, FOR BUILDING INSULATION
Infra Insulation, Inc.

BASES AND PADS, VIBRATION ISOLATING
Finn & Co., Inc., T.R.
Korfund Co., Inc., The
Vibration Mountings, Inc.

BEARINGS, BALL
Sealmaster Bearings Div. of Stephens-Adamson Mfg. Co.

BEARINGS, PILLOW BLOCK
Sealmaster Bearings Div. of Stephens-Adamson Mfg. Co.

BELLOWS, THERMOSTATIC AND METALLIC
U. S. Flexible Metallic Tubing Co.

BELTING, FLAT, RUBBER
Goodall Rubber Co.

BELTS, V
Dodge Mfg. Corp.
Goodall Rubber Co.

BENDERS, PIPE
Greenlee Tool Co., Div. of Greenlee Bros. & Co.

BENDERS, TUBING
Greenlee Tool Co., Div. of Greenlee Bros. & Co.

BENDS, EXPANSION, STEAM PIPE
Whitlock Mfg. Co.

BLADES, PROPELLER FAN
Koppers Co., Inc., Aeromaster Fan Dept.
Torrington Mfg. Co.

BLOWERS, HIGH PRESSURE
Barry Blower Co.
Buffalo Forge Co.
Clarage Fan Co.
General Blower Co.
Peerless Electric Co.
Power Line Fan Co., Inc., Subsidiary of Chelsea Products, Inc.
Torrington Mfg. Co.
Trane Co., The
Westinghouse Electric Corp., Sturtevant Div.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

BOARDS, PANEL AND CONTROL
Barber-Colman Co.
Powers Regulator Co.
Will-Burt Co., The

BOILERS, HEATING, STEEL, FIRE TUBE
Fitzgibbons Boiler Co., Inc.
Orr & Sembower, Inc.

BOILERS, HEATING, STEEL, WATER TUBE
Embassy Steel Products, Inc.
Rite Engineering & Mfg. Corp.

BOILERS, PACKAGED UNITS, HEATING AND PROCESS — Including Controls, Feed Pump, etc.
Ames Iron Works, Inc.
Boiler Engineering & Supply Co.
Fitzgibbons Boiler Co., Inc.
Iron Fireman Mfg. Co.
Orr & Sembower, Inc.
Petro

BOILERS, PORTABLE, STEAM, FOR STEAM CLEANING, MISCELLANEOUS PROCESSES, OTHER USES
Pantex Mfg. Corp.

BOOKS, TECHNICAL DATA
Color-Art Printing & Stationery Co.

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL
Best Combustion Equipment Co., Inc., W. N.
Gordon & Piatt, Inc.
Iron Fireman Mfg. Co.
Mettler Co., Inc., The,
Div. of Eclipse Fuel Engineering Co.
Petro
Webster Engineering Co.

BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL
Best Combustion Equipment Co., Inc., W.N.
Gordon & Piatt, Inc.
Iron Fireman Mfg. Co.
Mettler Co., Inc., The,
Div. of Eclipse Fuel Engineering Co.
Petro
Webster Engineering Co.

BURNERS, NATURAL AND LP GAS, COMMERCIAL AND INDUSTRIAL
Gordon & Piatt, Inc.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL
Best Combustion Equipment Co., Inc., W.N.
Iron Fireman Mfg. Co.
Mettler Co., Inc., The,
Div. of Eclipse Fuel Engineering Co.
Petro
Sun-Ray Burner Mfg. Corp.
Webster Engineering Co.

CABLE AND WIRE, THERMOSTAT
Chester Cable Corp.

CEILINGS, RADIANT HEATING AND COOLING AND ACOUSTICAL CONTROL
Burgess Manning Co., Architectural Products Div.

CEMENT & COMPOUNDS, PIPE JOINT
Radiator Specialty Co.
W-K-M Mfg. Co., Div. of ACF Industries, Inc.

CEMENT, INSULATING
Moore, Inc., Goodloe E.
Zonolite Co.

CHANGERS, SPEED
Allis Co., Louis, The

CHASERS, PIPE AND BOLT
Oster Mfg. Co.

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION
Acme Industries, Inc.
Carrier Corp.
Dole Refrigerating Co.

Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Dunham-Bush, Inc.
Kennard Corp.
Vilter Mfg. Co., The

CIRCULATORS, FOR HOT WATER HEATING SYSTEMS
Bell & Gossett Co.
Dunham-Bush, Inc.

CLAMPS, BEAM, PIPE HANGING
Carpenter & Paterson, Inc.

CLAMPS, PIPE REPAIR
Pipe Line Development Co., The

CLAMPS, PIPE, WELDING
Jewel Mfg. Co.

CLOTH, TREATED, FOR DUST COLLECTORS
Star Woolen Co.

COATINGS, PROTECTIVE, FOR METALS
Ellicott Fabricators, Inc.
Gates Engineering Co.
Goodall Rubber Co.
Miracle Adhesives Corp.
Pittsburgh Plate Glass Co.
Tapecoat Co., The

COILS, CONDENSATION
Vilter Mfg. Co., The

COILS, FOR HOT WATER STORAGE TANKS
Davis Engineering Co.
Whitlock Mfg. Co.

COILS, PIPE
Vilter Mfg. Co., The
Whitlock Mfg. Co.

COLLECTORS, DUST
American Air Filter Co., Inc.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL
Carrier Corp.

COMPOUNDS, BOILER CLEANING
Oakite Products, Inc.

COMPOUNDS, BOILER AND RADIATOR SEALING
Radiator Specialty Co.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER
Oakite Products, Inc.

COMPRESSORS, REFRIGERATING, COMBINED WITH CONDENSER, WATER CHILLER, PIPING CONNECTIONS, AND CONTROLS
Acme Industries, Inc.
Bell & Gossett Co.
Carrier Corp.
Dunham-Bush, Inc.
Frick Co.
Heat-X, Inc.
Trane Co., The
Vilter Mfg. Co., The

COMPRESSORS, REFRIGERATING, RECIPROCATING
Carrier Corp.
Copeland Refrigeration Corp.
Dunham-Bush, Inc.
Frick Co.
Vilter Mfg. Co., The

CONCRETE, INSULATING, FOR UNDERGROUND PIPING
Zonolite Co.

CONDENSERS, REFRIGERATING, AIR COOLED
Blazer & Son, M.
Carrier Corp.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Heat-X, Inc.
Thermal Engineering Corp.

CONDENSERS, REFRIGERATING, EVAPORATIVE
Acme Industries, Inc.
Baltimore Aircoil Co., Inc.
Carrier Corp.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Governair Corp.
Kennard Corp.
Vilter Mfg. Co., The

CONDENSERS, REFRIGERATING, SHELL AND COIL
Acme Industries, Inc.
Vilter Mfg. Co., The
Whitlock Mfg. Co.

CONDENSERS, REFRIGERATING, SHELL AND TUBE
Acme Industries, Inc.
Frick Co.
Vilter Mfg. Co., The
Whitlock Mfg. Co.

CONDUIT, UNDERGROUND PIPING
Durant Insulated Pipe Co.
Porter & Co., H. W.
Ric-wiL, Inc.

CONNECTIONS, DUCT, FLEXIBLE
Elgen Mfg. Co.
Grant Wilson, Inc.
Wiremold Co., The

CONTROL SYSTEMS, PRE-ASSEMBLED AS UNITS, FOR HEATING, COOLING, AND VENTILATING
Barber-Colman Co.

CONTROLLERS AND STARTERS, MOTOR
Furnas Electric Co.

CONTROLS, DRAFT, BAROMETRIC
Field Control Div., H. D. Conkey & Co.
General Controls Co.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEM
Grinnell Co., Inc.

CONVERTERS, STEAM
Ellicott Fabricators, Inc.
Richmond Engineering Co.
Yula Water Heaters, Inc.

CONVEYORS, COAL AND ASH
Canton Stoker Corp.

COOLERS, OIL
Whitlock Mfg. Co.

COOLERS, UNIT
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Vilter Mfg. Co., The

COUPLINGS, FLEXIBLE, POWER TRANSMISSION
Waldron Corp., John

COUPLINGS, PIPE
Capitol Mfg. & Supply Co.
Dresser Mfg. Div., Dresser Industries, Inc.
Pipe Line Development Co., The
Porter Co., Inc., H. K., W-S Fittings Div.
Tube Turns, A Div. of National Cylinder Gas Co.

CUT-OFFS, LOW WATER, HEATING BOILER
Mercoid Corp.
McDonnell & Miller, Inc.
Reliance Gauge Column Co.
Watts Regulator Co.

CUTTERS, PIPE
Oster Mfg. Co.
Reed Mfg. Co.

DAMPERS, DIFFUSERS
Barber-Colman Co.
Hart & Cooley Mfg. Co.
United States Register Co.

DAMPERS, DUCT, MANUALLY OPERATED
Air & Refrigeration Corp.
Titus Mfg. Corp.
Waterloo Register Co., Inc.

DAMPERS, DUCT, REMOTE CONTROLLED
Air & Refrigeration Corp.
Barber-Colman Co.

DEAERATORS
Whitlock Mfg. Co.

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION
Surface Combustion Corp.

DEHUMIDIFIERS, SPRAYED COIL
Blazer & Son, M.
Clarage Fan Co.
Kennard Corp.

DESUPERHEATERS, STEAM
Whitlock Mfg. Co.

DETECTORS, LEAK, FUEL OIL
Davis Engineering Corp.

DIFFUSERS, AIR, BASEBOARD
Titus Mfg. Corp.
Universal Diffuser Corp.

DIFFUSERS, AIR, CEILING
A-J Mfg. Co.
Air Devices, Inc.
Air Distribution Products Co.
Anemostat Corp. of America
Barber-Colman Co.
Hart & Cooley Mfg. Co.
Krueger Air Conditioning Corp.
Titus Mfg. Corp.
United States Register Co.
Universal Diffuser Corp.

DIFFUSERS, AIR, CEILING WITH COMBINED LIGHTING FIXTURES
Multi-Vent Div. of the Pyle-National Co.

DIFFUSERS, AIR, FLOOR
A-J Mfg. Co.
Air Devices, Inc.
Titus Mfg. Corp.
Universal Diffuser Corp.

DIFFUSERS, AIR, HIGH PRESSSURE
Air Devices, Inc.
Anemostat Corp. of America
Barber-Colman Co.
Titus Mfg. Corp.
Universal Diffuser Corp.

DIFFUSERS, AIR, WALL
A-J Mfg. Co.
Air Devices, Inc.
Air Distribution Products Co.
Anemostat Corp. of America
Barber-Colman Co.
Hart & Cooley Mfg. Co.
Titus Mfg. Corp.
United States Register Co.
Universal Diffuser Corp.

DRILLS, MASONRY
Wheel Trueing Tool Co.

DRIVES, POWER, FOR PIPE THREADING
Oster Mfg. Co.
Ridge Tool Co.

DRIVES, V BELT
Dodge Mfg. Corp.

DUCTS AND DUCT FITTINGS, PREFABRICATED, FLEXIBLE, NON-METALLIC
Flexible Tubing Corp.
Wiremold Co., The

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-FLEXIBLE, NON-METALLIC
Johns-Manville
Sonoco Products Co.

DUCTS, SPIRAL WELDED
United Sheet Metal Co.

ECONOMIZERS, FUEL
Richmond Engineering Co.

ELBOWS AND TEES, BALANCING, FOR HOT WATER HEATING AND CHILLED WATER SYSTEMS
Dunham-Bush, Inc.
Sarco Co., Inc.

ELECTRODES, ARC WELDING
Hobart Bros. Co.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS
Anderson Co., The V. D.
Dunham-Bush, Inc.
Marsh Heating Equipment Co.
Sarco Co., Inc.

ELIMINATORS, SLUG, REFRIGERANT
Blazer & Son, M.

ENAMELS AND LACQUERS
Pittsburgh Plate Glass Co.

EXCHANGERS, HEAT, SHELL & TUBE
Acme Industries, Inc.
Davis Engineering Co.
Dunham-Bush, Inc.
Ellicott Fabricators, Inc.
Marlo Coil Co.
Richmond Engineering Co.
Trane Co., The
Vilter Mfg. Co., The
Whitlock Mfg. Co.
Yula Water Heaters, Inc.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE
Acme Industries, Inc.
Dunham-Bush, Inc.
Heat-X, Inc.
Marlo Coil Co.
Vilter Mfg. Co., The

EXHAUSTERS, WELDING FUME
Allen Cooler & Ventilator, Inc.
Barry Blower Co.
Gallaher Co., The
General Blower Co.
Jenn-Air Products Co.
Quickdraft Corp.

FANS, AXIAL FLOW, PRESSURE TYPE
Buffalo Forge Co.
Air Moving & Conditioning Association, Inc.
DeBothezat Fans, Div. of American Machine and Metals, Inc.
Power Line Fan Co., Inc., Subsidiary of Chelsea Products, Inc.
Propellair Div., Robbins & Myers, Inc.
South Bend Air Products, Inc.
Westinghouse Electric Corp., Sturtevant Div.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

FANS, CENTRIFUGAL
Air Moving & Conditioning Association, Inc.
American Blower Div. of American-Standard
Barry Blower Co.
Bishop & Babcock Mfg. Co.
Buffalo Forge Co.
Chicago Blower Corp.
Clarage Fan Co.
General Blower Co.
Ilg Electric Ventilating Co.
New York Blower Co., The
Peerless Electric Co.
Power Line Fan Co., Inc., Subsidiary of Chelsea Products, Inc.
Trane Co., The
Westinghouse Electric Corp., Sturtevant Div.

FANS, MATERIAL HANDLING
Clarage Fan Co.
General Blower Co.
New York Blower Co., The
Peerless Electric Co.

FANS, MECHANICAL DRAFT, FOR BOILERS
Barry Blower Co.
Clarage Fan Co.
General Blower Co.
Quickdraft Corp.
Westinghouse Electric Corp., Sturtevant Div.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

FANS, PROPELLER
Air Moving & Conditioning Association, Inc.
Bishop & Babcock Mfg. Co.
Buffalo Forge Co.
Clarage Fan Co.
DeBothezat Fans, Div. of American Machine and Metals, Inc.
General Blower Co.
Peerless Electric Co.
Power Line Fan Co., Inc., Subsidiary of Chelsea Products, Inc.
Propellair Div., Robbins & Myers, Inc.
South Bend Air Products, Inc.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

FASTENERS, INSULATION
Graham Mfg. Corp.
Moore, Inc., Goodloe E.
Stic-Klip Mfg. Co., Inc.

FASTENERS, POWDER OPERATED
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp.
Remington Arms Co., Inc.

FEEDERS, WATER, HEATING BOILER
McDonnell & Miller, Inc.
Watts Regulator Co.

FILTERS, AIR, AUTOMATIC, DRY
Continental Air Filters, Inc.
Farr Company

FILTERS, AIR, AUTOMATIC, VISCOUS
Continental Air Filters, Inc.
Farr Company

FILTERS, AIR, GREASE
Continental Air Filters, Inc.
Farr Company

FILTERS, AIR, HIGH TEMPERATURE (for use in filtering air at temperatures of 1000 F and above)
Mine Safety Appliances Co.

FILTERS, AIR, PANEL, DRY
American Air Filter Co., Inc.
Arco Mfg. Corp.
Cambridge Filter Corp.
Carey Electronic Engineering Co., Metal Wool Div.
Continental Air Filters, Inc.
Farr Company
Research Products Corp.
Star Woolen Co.

FILTERS, AIR, PANEL, DRY, SUBMICRON PARTICULATE
Farr Company
Flanders Filters, Inc.
Mine Safety Appliances Co.

FILTERS, AIR, PANEL, WITH PLASTIC MEDIA
Continental Air Filters, Inc.
Stoddard Industries, Inc.

FILTERS, AIR, PANEL, VISCOUS
Air Devices, Inc.
Continental Air Filters, Inc.
Evans Corp., The George
Farr Company
Research Products Corp.

FILTERS, AIR, THROW-AWAY
Arco Mfg. Corp.
Farr Company
Flanders Filters, Inc.

FITTINGS, COPPER TUBE
American Brass Co.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE
Dunham-Bush, Inc.

FITTINGS, LINED
American Hard Rubber Co., Div. of Amerace Corp.

FITTINGS, PIPE
American Hard Rubber Co., Div. of Amerace Corp.
Babcock & Wilcox Co., The, Tubular Products Div.
Capitol Mfg. & Supply Co.
Crane Co.
Dresser Mfg. Div., Dresser Industries, Inc.
Duriron Co., Inc., The
Grinnell Co., Inc.
Midwest Piping Co., Inc.
Porter Co., Inc., H.K., W-S Fittings Div.
Tube Turns, A Div. of National Cylinder Gas Co.
Vilter Mfg. Co., The
Walworth Co.

FITTINGS, REFRIGERATION
Porter Co., Inc., H. K., W-S Fittings Div.
Vilter Mfg. Co., The

FLANGES, PIPE
Babcock & Wilcox Co., The, Tubular Products Div.
Crane Co.
Grinnell Co., Inc.
Midwest Piping Co., Inc.
Ritter Pattern & Casting Co., Inc.
Tube Turns, A Div. of National Cylinder Gas Co.
Vilter Mfg. Co., The
Walworth Co.

FLOATS, STEAM TRAP
Trane Co., The

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING CENTRAL HEATING
Campbell Heating Co.
Hayes Furnace Mfg. & Supply Co.
Mammoth Furnace Co.

GAGES, INDICATING, DRAFT
Canton Stoker Corp.
General Controls Co.

GAGES, INDICATING, PRESSURE
Canton Stoker Corp.
Dunham-Bush, Inc.
United States Gauge Div. of American Machine & Metals, Inc.

GAGES, INDICATING, VACUUM
Dunham-Bush, Inc.
United States Gauge Div. of American Machine & Metals, Inc.

GAGES, LIQUID LEVEL
Liquidometer Corp.
Penn Instruments Div., Burgess-Manning Co.
Petrometer Corp.
United States Gauge Div. of American Machine & Metals, Inc.

GAGES, OIL TANK
Liquidometer Corp.
Petrometer Corp.

GENERATORS, STEAM, ELECTRIC, (Electrically "fired" Boilers)
Pantex Mfg. Corp.

GOVERNORS, PUMP
Davis Regulator Co.

GRILLES
A-J Mfg. Co.
Barber-Colman Co.
Diamond Mfg. Co.
Hart & Cooley Mfg. Co.
Hendrick Mfg. Co.
Independent Register Co.
Krueger Air Conditioning Corp.
Titus Mfg. Corp.
Waterloo Register Co., Inc.

HANGERS AND SUPPORTS, PIPE
Carpenter & Paterson, Inc.
Finn & Co., Inc., T.R.
Grinnell Co., Inc.
Korfund Co., Inc., The
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp.
Ritter Pattern & Casting Co., Inc.
Vibration Mountings, Inc.

HEATERS, AIR, DIRECT FIRED, COAL
Campbell Heating Co.

HEATERS, AIR, DIRECT FIRED, COMBINATION GAS AND OIL
Johnson Heater Corp.
Lennox Industries, Inc.
Mammoth Furnace Co.
National Heater Co., Inc.
Reznor Mfg. Co.

HEATERS, AIR, DIRECT FIRED, GAS, CENTRIFUGAL FAN TYPE
Campbell Heating Co.
Carrier Corp.
Hayes Furnace Mfg. & Supply Co.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp.
Johnson Heater Corp.
Lennox Industries, Inc.
Mammoth Furnace Co.
National Heater Co., Inc.
OverHead Heaters, Inc.
Reznor Mfg. Co.

HEATERS, AIR, DIRECT FIRED, GAS, PORTABLE, FOR SPACE HEATING
National Heater Co., Inc.

HEATERS, AIR, DIRECT FIRED, OIL, FLOOR TYPE
Campbell Heating Co.
Carrier Corp.
Johnson Heater Corp.
Lennox Industries, Inc.
Mammoth Furnace Co.
National Heater Co., Inc.
Reznor Mfg. Co.

HEATERS, AIR, DIRECT FIRED, OIL, PORTABLE FOR SPACE HEATING
National Heater Co., Inc.

HEATERS, AIR, DIRECT FIRED, OIL, SUSPENDED TYPE
Johnson Heater Corp.
Lennox Industries, Inc.
Mammoth Furnace Co.
National Heater Co., Inc.
OverHead Heaters, Inc.
Reznor Mfg. Co.

HEATERS, DUCT, GAS
Hayes Furnace Mfg. & Supply Co.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp.
Modine Mfg. Co.

HEATERS, INDIRECT, SUBMERGED
Davis Engineering Co.
Richmond Engineering Co.
Yula Water Heaters, Inc.

HEATERS, OIL TANK, SUCTION BELL
Davis Engineering Co.
Richmond Engineering Co.
Yula Water Heaters, Inc.

HEATERS, UNIT, GAS, PROPELLER FAN TYPE
Grinnell Co., Inc.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp.
Modine Mfg. Co.
Nesbitt, Inc., John J.
Trane Co., The
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

HEATERS, UNIT, STEAM AND HOT WATER, CABINET TYPE
Buffalo Forge Co.
Clarage Fan Co.
Dunham-Bush, Inc.
Nesbitt, Inc., John J.
Webster & Co., Warren
Westinghouse Electric Corp., Sturtevant Div.

HEATERS, UNIT, STEAM AND HOT WATER, CENTRIFUGAL FAN TYPE
Bishop & Babcock Mfg. Co.
Buffalo Forge Co.
Clarage Fan Co.
Dunham-Bush, Inc.
Kennard Corp.
Nesbitt, Inc., John J.
Thermal Engineering Corp.
Trane Co., The
Westinghouse Electric Corp. Sturtevant Div.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, HORIZONTAL BLOW
Airtherm Mfg. Co.
Buffalo Forge Co.
Clarage Fan Co.
Dunham-Bush, Inc.
Grinnell Co., Inc.
Modine Mfg. Co.
Murray Mfg. Co., D. J.
Nesbitt, Inc., John J.
Trane Co., The
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, VERTICAL BLOW
Airtherm Mfg. Co.
Clarage Fan Co.
Dunham-Bush, Inc.
Grinnell Co., Inc.
Modine Mfg. Co.
Murray Mfg. Co., D. J.
Nesbitt, Inc., John J.
Trane Co., The
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

HEATERS, WATER
Bell & Gossett Co.
Davis Engineering Co.
Ellicott Fabricators, Inc.
Finnigan Co., Inc., J.J.
Richmond Engineering Co.
Whitlock Mfg. Co.
Yula Water Heaters, Inc.

HOSE, FLEXIBLE, METAL AND FITTINGS
Finn & Co., Inc., T.R.
Flexaust Co.
Flexible Tubing Corp.
Goodall Rubber Co.
Packless Metal Hose, Inc.
Vibration Mountings, Inc.

HOSE, NON-METAL, AND FITTINGS
Flexaust Co.
Vibration Mountings, Inc.

HOUSINGS, FAN
Barry Blower Co.

HUMIDIFIERS, CENTRAL PLANT
Buffalo Forge Co.
Research Products Corp.
Surface Combustion Corp.

HUMIDIFIERS, DIRECT, SPRAY HEAD
Spraying Systems Co.

HUMIDIFIERS, UNIT, ROOM TYPE
Research Products Corp.
Spraying Systems Co.

HUMIDISTATS
Powers Regulator Co.

HYGROMETERS
Taylor Instrument Companies

INDICATOR-CONTROLLERS, PRESSURE
Penn Instruments Div., Burgess-Manning Co.
Powers Regulator Co.

INDICATOR-CONTROLLERS, TEMPERATURE
Penn Instruments Div., Burgess-Manning Co.
Powers Regulator Co.

INDICATORS, LIQUID LEVEL, BOILER AND TANK
Penn Instruments Div., Burgess-Manning Co.

INSULATION, BOILER, TANK & EQUIPMENT
Mundet Cork Corp.
Pittsburgh Plate Glass Co.

INSULATION, BUILDING
Gustin-Bacon Mfg. Co.
Infra Insulation, Inc.

INSULATION, DUCT, SOUND DEADENING (FOR APPLICATION INSIDE DUCT)
Baldwin-Hill Co.
Grant Wilson, Inc.
Gustin-Bacon Mfg. Co.
L.O.F. Glass Fibers Co.
United Sheet Metal Co.

INSULATION, DUCT, THERMAL
Baldwin-Hill Co.
Grant Wilson, Inc.
Gustin-Bacon Mfg. Co.
L.O.F. Glass Fibers Co.
Mundet Cork Corp.

INSULATION, PIPE AND TUBING
Armstrong Cork Co.
Gustin-Bacon Mfg. Co.
Miracle Adhesives Corp.
Mundet Cork Corp.
United Cork Companies

INSULATION, PIPE, UNDERGROUND
Porter & Co., Inc., H. W.
Ric-wiL, Inc.
Zonolite Co.

JETS, OVERFIRE AIR, FOR SMOKE ABATEMENT
Canton Stoker Corp.

JOINTS, PIPE, EXPANSION, PACKLESS, METAL
Adsco Div., Yuba Consolidated Industries, Inc.
American Boa, Inc.
Finn & Co., Inc., T.R.
U. S. Flexible Metallic Tubing Co.

JOINTS, PIPE, EXPANSION, PACKLESS, RUBBER
Goodall Rubber Co.
United States Rubber Co.

JOINTS, PIPE, EXPANSION, SLIP
Adsco Div., Yuba Consolidated Industries, Inc.
Dresser Mfg. Div., Dresser Industries, Inc.
Yarnall-Waring Co.

LININGS, TANK
Ellicott Fabricators, Inc.

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED
Air & Refrigeration Corp.
Swartwout Co., The

MACHINES, PIPE CUTTING AND THREADING
Oster Mfg. Co.
Ridge Tool Co.

MACHINES, REFRIGERATION, ABSORPTION
Carrier Corp.

MARKERS, PIPE, HOLE AND SADDLE
Jewel Mfg. Co.

METERS, FLOW, GAS OR AIR
Builders-Providence, Inc., Div. of B-I-F Industries, Inc.
Penn Instruments Div., Burgess-Manning Co.

METERS, FLOW, STEAM
Builders-Providence, Inc., Div. of B-I-F Industries, Inc.
Penn Instruments Div., Burgess-Manning Co.

METERS, VOLUME, AIR AND GAS
Penn Instruments Div., Burgess-Manning Co.

METERS, WATER
Builders-Providence, Inc., Div. of B-I-F Industries, Inc.
Penn Instruments Div., Burgess-Manning Co.

MOTORS, ELECTRIC, FRACTIONAL HP
Century Electric Co.
Emerson-Electric Mfg. Co.
Marathon Electric Mfg. Corp.
Peerless Electric Co.
Wagner Electric Corp.

MOTORS, ELECTRIC, 1 HP AND OVER
Allis Co., Louis, The
Century Electric Co.
Marathon Electric Mfg. Corp.
Peerless Electric Co.
Wagner Electric Corp.

NIPPLES, PIPE
Capitol Mfg. & Supply Co.
Crane Co.
Grinnell Co., Inc.

NOZZLES, ATOMIZING
Binks Mfg. Co.
Monarch Mfg. Works, Inc.
Spraying Systems Co.

NOZZLES, FLOODING
Binks Mfg. Co.

NOZZLES, OIL BURNER
Monarch Mfg. Works, Inc.

NOZZLES, SPRAY
Binks Mfg. Co.
Monarch Mfg. Works, Inc.
Spraying Systems Co.

OILS, FOR COATING VISCOUS AIR FILTERS
Research Products Corp.

OPERATORS, DAMPER, DUCT
Barber-Colman Co.

OPERATORS, VALVE, HYDRAULIC OR ELECTRIC
Barber-Colman Co.
McDonnell & Miller, Inc.
Powers Regulator Co.

PACKING, ASBESTOS
Grant Wilson, Inc.

PAINT, HIGH TEMPERATURE, FOR HOT SURFACES
Pittsburgh Plate Glass Co.

PANELS, PERFORATED, FOR AIR DIFFUSION
Multi-Vent Div. of the Pyle-National Co.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT
Alter Co., Harry

PIPE, ALUMINUM
Wolverine Tube, Div. of Calumet and Hecla, Inc.

PIPE, ASBESTOS FIBER AND CEMENT
Johns-Manville

PIPE, BRASS AND COPPER
American Brass Co.
Bridgeport Brass Co.
Hussey & Co., C. G., Div. of Copper Range Co.
Lewin-Mathes Co., Div. of Cerro de Pasco Corp.
Reading Tube Corp.
Wolverine Tube, Div. of Calumet & Hecla, Inc.

PIPE, CAST IRON
Duriron Co., Inc., The

PIPE, FINNED
Heat Transfer Products, Inc.

PIPE AND FITTINGS, GAS VENT AND FLUE
Johns-Manville

PIPE, HARD RUBBER
American Hard Rubber Co., Div. of Amerace Corp.

PIPE, LINED
American Hard Rubber Co., Div. of Amerace Corp.

PIPE, PLASTIC
American Hard Rubber Co., Div. of Amerace Corp.

PIPE, PRE-INSULATED
Durant Insulated Pipe Co.
Ric-wiL, Inc.

PIPE, STEEL
Babcock & Wilcox Co., The, Tubular Products Div.
Bethlehem Steel Co.
Committee on Steel Pipe Research, American Iron & Steel Institute
Jones & Laughlin Steel Corp.
Spang-Chalfant, Div. of The National Supply Co.
Wheatland Tube Co.
Youngstown Sheet & Tube Co.

PLASTICS, POWDERS and RESINS (Basic Materials)
Goodrich Chemical Co., B.F.
Pittsburgh Plate Glass Co.

PLATES, FLOOR AND CEILING
Ritter Pattern & Casting Co., Inc.

PLUGS, PIPE
Capitol Mfg. & Supply Co.

PREHEATERS, FUEL OIL
Davis Engineering Co.
Richmond Engineering Co.
Yula Water Heaters, Inc.

PROTECTORS, PIPE COVERING
Carpenter & Paterson, Inc.
Grant Wilson, Inc.

PSYCHROMETERS, SLING AND HAND ASPIRATED
Taylor Instrument Companies
United States Gauge Div. of American Machine & Metals, Inc.

PULLEYS AND SHEAVES, FOR BELT DRIVES
Dodge Mfg. Corp.

PUMP-MOTOR UNITS, CLOSE-COUPLED
Aurora Pump Div., The New York Air Brake Co.
Buffalo Pumps, Inc., Div. of Buffalo Forge Co.
Ingersoll-Rand Co.
Myers & Bro. Co., F.E.

PUMPS, BOILER FEED
American-Marsh Pumps, Inc.
Eagan Co., Inc., Walter H.

PUMPS, CENTRIFUGAL
American-Marsh Pumps, Inc.
Aurora Pump Div., The New York Air Brake Co.
Buffalo Pumps, Inc., Div. of Buffalo Forge Co.
Carver Pump Co.
Dunham-Bush, Inc.
Eagan Co., Inc., Walter H.
Myers & Bro. Co., F. E.
Skidmore Corp.
Wilson-Snyder Works, Oil Well Supply Div., U.S. Steel Corp.

PUMPS, CONDENSATE RETURN
Dunham-Bush, Inc.
Eagan Co., Inc., Walter H.
Hoffman Specialty Mfg. Corp.
Myers & Bro. Co., F. E.
Skidmore Corp.
Sterling, Inc.
Weil Pump Co.

PUMPS, EVAPORATIVE COOLER
Aurora Pump Div., The New York Air Brake Co.
Myers & Bro. Co., F. E.

PUMPS, GEAR
Tuthill Pump Co.

PUMPS, PROPORTIONING
Eagan Co., Inc., Walter H.

PUMPS, RECIPROCATING
American Hard Rubber Co., Div. of Amerace Corp.

PUMPS, ROTARY
American Hard Rubber Co., Div. of Amerace Corp.

PUMPS, SEWAGE & SLUDGE
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp.

PUMPS, STEAM
American-Marsh Pumps, Inc.

PUMPS, SUMP
Skidmore Corp.

PUMPS, TURBINE TYPE
American-Marsh Pumps, Inc.
Eagan Co., Inc., Walter H.
Skidmore Corp.

PUMPS, VACUUM
Dunham-Bush, Inc.
Skidmore Corp.

PUMPS, VACUUM HEATING
Dunham-Bush, Inc.
Nash Engineering Co.
Sterling, Inc.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS
American-Marsh Pumps, Inc.
Tuthill Pump Co.

RADIATION, BASEBOARD, FERROUS
National-U.S. Radiator Corp., The
Sarco Co., Inc.

RADIATION, BASEBOARD, NON-FERROUS
Dunham-Bush, Inc.
Embassy Steel Products, Inc.
National-U.S. Radiator Corp., The
Nesbitt, Inc., John J.
Sarco Co., Inc.

RADIATION, CONVECTION TYPE, FERROUS

Embassy Steel Products, Inc.
Murray Mfg. Co., D.J.
National-U.S. Radiator Corp., The
Shaw-Perkins Mfg. Co.

RADIATION, CONVECTION TYPE, NON-FERROUS

Dunham-Bush, Inc.
Embassy Steel Products, Inc.
Modine Mfg. Co.
National-U.S. Radiator Corp., The
Nesbitt, Inc., John J.
Shaw-Perkins Mfg. Co.

RADIATION, DIRECT

Murray Mfg. Co., D. J.
Wilson Engineering Corp.

RADIATION, FIN TUBE TYPE

Dunham-Bush, Inc.
Embassy Steel Products, Inc.
Heat Transfer Products, Inc.
National-U.S. Radiator Corp., The
Nesbitt, Inc., John J.
Sarco Co., Inc.

RECEIVERS, REFRIGERANT, LIQUID

Acme Industries, Inc.
Vilter Mfg. Co., The

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

Powers Regulator Co.

RECORDER-CONTROLLERS, PRESSURE

Penn Instruments Div., Burgess-Manning Co.

RECORDER-CONTROLLERS, TEMPERATURE

Penn Instruments Div., Burgess-Manning Co.
Powers Regulator Co.

RECORDERS, LIQUID LEVEL

Penn Instruments Div., Burgess-Manning Co.

RECORDERS, PRESSURE AND VACUUM

Penn Instruments Div. Burgess-Manning Co.
United States Gauge Div. of American Machine & Metals, Inc.

RECORDERS, TEMPERATURE

Palmer Thermometers, Inc.
Penn Instruments Div., Burgess-Manning Co.
United States Gauge Div. of American Machine & Metals, Inc.

REFRIGERANTS

du Pont de Nemours & Co., E.I., "Freon" Products Div.
General Chemical Div., Allied Chemical & Dye Corp.

REGISTERS

A-J Mfg. Co.
Barber-Colman Co.
Hart & Cooley Mfg. Co.
Independent Register Co.
Krueger Air Conditioning Corp.
Titus Mfg. Corp.
United States Register Co.
Waterloo Register Co., Inc.

REGULATORS, AIR VELOCITY

Barber-Colman Co.

REGULATORS, DAMPER SETS

Elgen Mfg. Co.

REGULATORS, DRAFT, COMBUSTION

Canton Stoker Corp.
Field Control Div., H. D. Conkey & Co.
General Controls Corp.

REGULATORS, FLUID FLOW, FOR CONSTANT VOLUME

McDonnell & Miller, Inc.

REGULATORS, LEVEL, LIQUID

Alco Valve Co.
Canton Stoker Corp.
McDonnell & Miller, Inc.
Watts Regulator Co.

REGULATORS, PRESSURE, AIR

Barber-Colman Co.
Davis Regulator Co.
Powers Regulator Co.
Watts Regulator Co.

REGULATORS, PRESSURE, GAS

Davis Regulator Co.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEM

Bell & Gossett Co.
Mercoid Corp.
Powers Regulator Co.
Watts Regulator Co.

REGULATORS, PRESSURE, LIQUID

Davis Regulator Co.
McDonnell & Miller, Inc.
Watts Regulator Co.

REGULATORS, TEMPERATURE

Automatic Devices Co., Inc.
Barber-Colman Co.
Bell & Gossett Co.
McDonnell & Miller, Inc.
Mercoid Corp.
Powers Regulator Co.
Sarco Co., Inc.
Sterling, Inc.

RINGS, BACKING FOR PIPE WELDING

Robvon Backing Ring Co.

SCOOPS, AIR, FOR DEFLECTING FLOW IN DUCTS

A-J Mfg. Co.
Krueger Air Conditioning Corp.

SEPARATORS, AIR

Anderson Co., The V.D.
Dunham-Bush, Inc.
Trane Co., The

SEPARATORS, BLOWDOWN

Wilson Engineering Corp.

SHEETS, ALUMINUM

Fairmont Aluminum Co.

SHEETS, COPPER

Hussey & Co., C. G., Div. of Copper Range Co.

SHEETS, STEEL

Finnigan Co., Inc., J.J.
United States Steel Corp.
Weirton Steel Co.

STACKS AND CHIMNEYS, INDUSTRIAL, PREFABRICATED

Finnigan Co., Inc., J. J.

STANDS, PIPE VISE

Oster Mfg. Co.

STOCKS AND DIES

Ridge Tool Co.

STOKERS, INDUSTRIAL AND COMMERCIAL

Canton Stoker Corp.
Will-Burt Co., The

STRAINERS, PIPE LINE

Anderson Co., The V.D.
Hoffman Specialty Mfg. Corp.
Sarco Co., Inc.
Sterling, Inc.
Trane Co., The

STRAINERS, REFRIGERANT, LIQUID LINE

Alco Valve Co.

SURFACE, FINNED, COOLING, BRINE

Aerofin Corp.
Blazer & Son, M.
Marlo Coil Co.
Murray Mfg. Co., D. J.
Trane Co., The

SURFACE, FINNED, COOLING, COLD WATER

Aerofin Corp.
Blazer & Son, M.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Governair Corp.
Kennard Corp.
Marlo Coil Co.
McQuay Inc.
Murray Mfg. Co., D. J.
Nesbitt, Inc., John J.
Thermal Engineering Corp.
Trane Co., The

SURFACE, FINNED, COOLING, DIRECT EXPANSION

Aerofin Corp.
Blazer & Son, M.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Governair Corp.
Kennard Corp.
Marlo Coil Co.
McQuay Inc.
Murray Mfg. Co., D.J.
Thermal Engineering Corp.
Trane Co., The

SURFACE, FINNED, HEATING AND COOLING, PRE-ASSEMBLED, INCLUDING COILS, ELIMINATOR PLATES, SETTLING TANK, AND CASING

Blazer & Son, M.
Marlo Coil Co.
Trane Co., The

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Marlo Coil Co.
Murray Mfg. Co., D. J.
Trane Co., The

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

Aerofin Corp.
Blazer & Son, M.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Governair Corp.
Kennard Corp.
Marlo Coil Co.
Nesbitt, Inc., John J.
Rempe Co.
Thermal Engineering Corp.
Trane Co., The

SWITCHES, ELECTRICAL

McDonnell & Miller, Inc.

SWITCHES, FLOAT, REFRIGERATION

Alco Valve Co.

SWITCHES, FLOW

McDonnell & Miller, Inc.

SWITCHES, LIQUID LEVEL

Alco Valve Co.
McDonnell & Miller, Inc.

SWITCHES, MERCURY

Mercoid Corp.

SWITCHES, PRESSURE AND VACUUM

Mercoid Corp.

SWITCHES, TIME

Automatic Devices Co., Inc.
Paragon Electric Co.

SYSTEMS, COMBUSTION CONTROL

Canton Stoker Corp.
Orr & Sembower, Inc.

SYSTEMS, CONDENSATE RETURN

Dunham-Bush, Inc.

SYSTEMS, HEATING, HOT WATER

Bell & Gossett Co.

SYSTEMS, ROOF SPRAYING (for cooling roofs)
Muellermist Irrigation Co.
Ruppright's Rotary Roof Cooler

TANKS, BLOW OFF
Finnigan Co., Inc., J.J.
Richmond Engineering Co.

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS
American Tube Products, Inc.
Finnigan Co., Inc., J.J.
Richmond Engineering Co.

TANKS, PROCESS AND STORAGE
Ellicott Fabricators, Inc.
Finnigan Co., Inc., J.J.
Richmond Engineering Co.
Whitlock Mfg. Co.

TAPE, DUCT, ADHESIVE, FOR SEALING JOINTS
Arno Adhesive Tapes, Inc.

TAPE, INDUSTRIAL, ADHESIVE
Arno Adhesive Tapes, Inc.

THERMOMETERS, INDICATING, INDUSTRIAL
Palmer Thermometers, Inc.
United States Gauge Div. of American Machine & Metals, Inc.

THERMOMETERS, INDICATING, PIPE SURFACE TEMPERATURE
Illinois Testing Laboratories, Inc.

THERMOMETERS, INDICATING, REMOTE-READING
General Controls Corp.
Palmer Thermometers, Inc.
United States Gauge Div. of American Machine & Metals, Inc.

THERMOSTATS, DUCT TYPE
Barbor-Colman Co.
Mercoid Corp.

THERMOSTATS, IMMERSION
Mercoid Corp.

THERMOSTATS, ROOM OR WALL
Barber-Colman Co.
Powers Regulator Co.

THERMOSTATS, TWO TEMPERATURE OR DUAL
Mercoid Corp.

THERMOSTATS, WEATHER COMPENSATING
Automatic Devices Co., Inc.

TOOLS
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp. (Powder actuated)

TOWERS, COOLING, ATMOSPHERIC DRAFT
Binks Mfg. Co.
Lilie-Hoffman Cooling Towers, Inc.
Pritchard & Co. of California, J. F.

TOWERS, COOLING, MECHANICAL DRAFT
Acme Industries, Inc.
Baltimore Aircoil Co., Inc.
Binks Mfg. Co.
Blazer & Son, M.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Dunham-Bush, Inc.
Fluor Products Co.
Kennard Corp.
Lilie-Hoffman Cooling Towers, Inc.
Phillips Cooling Tower Co., Inc.
Pritchard & Co. of California, J. F.

TRANSFORMERS, ELECTRIC
Wagner Electric Corp.

TRANSMITTERS, PRESSURE AND TEMPERATURE
United States Gauge Div. of American Machine & Metals, Inc.

TRAPS, STEAM, FLOAT-THERMOSTATIC
Dunham-Bush, Inc.
Hoffman Specialty Mfg. Corp.
Marsh Heating Equipment Co.
Sarco Co., Inc.
Sterling, Inc.
Trane Co., The

TRAPS, STEAM, LIFT
Sarco Co., Inc.

TRAPS, STEAM, MECHANICAL
Anderson Co., The V. D.
Armstrong Machine Works
Hoffman Specialty Mfg. Corp.
Marsh Heating Equipment Co.
Sarco Co., Inc.
Sterling, Inc.
Trane Co., The

TRAPS, STEAM, RADIATOR
Dunham-Bush, Inc.
Marsh Heating Equipment Co.

TRAPS, STEAM, THERMOSTATIC
Anderson Co., The V. D.
Dunham-Bush, Inc.
Marsh Heating Equipment Co.
Sarco Co., Inc.
Sterling, Inc.
Trane Co., The

TREATMENT, WATER, TO INHIBIT CORROSION
Oakite Products, Inc.

TREATMENT, WATER, TO PREVENT SCALE FORMATION
Oakite Products, Inc.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL
Oakite Products, Inc.

TUBES, BOILER
Babcock & Wilcox Co., The, Tubular Products Div.

TUBES, CONDENSERS
Babcock & Wilcox Co., The, Tubular Products Div.
Lewin-Mathes Co., Div. of Cerro de Pasco Corp.
Wolverine Tube, Div. of Calumet & Hecla, Inc.

TUBING
American Brass Co.
American Hard Rubber Co., Div. of Amerace Corp.
Babcock & Wilcox Co., The, Tubular Products Div.
Bridgeport Brass Co.
Flexible Tubing Corp.
Heat Transfer Products, Inc.
Hussey & Co., C. G., Div. of Copper Range Co.
Lewin-Mathes Co., Div. of Cerro de Pasco Corp.
Packless Metal Hose, Inc.
Reading Tube Corp.
Wolverine Tube, Div. of Calumet and Hecla, Inc.

TURBINES, MECHANICAL DRIVE
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co. Inc.

UNIONS, MALLEABLE, BRASS SEAT
Fairbanks Co., The

UNIONS, STEEL
Capitol Mfg. & Supply Co.
Crane Co.
Porter Co., Inc., H. K., W-S Fittings Div.

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE
Air & Refrigeration Corp.
American Blower Div. of American-Standard
Bishop & Babcock Mfg. Co.
Blazer & Son, M.
Buffalo Forge Co.
Clarage Fan Co.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Dunham-Bush, Inc.
General Electric Co., Commercial & Industrial Air Conditioning Dept.
Governair Corp.
Kennard Corp.
Marlo Coil Co.
McQuay Inc.
Nesbitt, Inc., John J.
Thermal Engineering Corp.
Trane Co., The
Vilter Mfg. Co., The

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE
American Blower Div. of American-Standard
Blazer & Son, M.
Clarage Fan Co.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Dunham-Bush, Inc.
Governair Corp.
Kennard Corp.
Marlo Coil Co.
Modine Mfg. Co.
Nesbitt, Inc., John J.
Thermal Engineering Corp.
Trane Co., The
Vilter Mfg. Co., The

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE
Air & Refrigeration Corp.
Bishop & Babcock Mfg. Co.
Buffalo Forge Co.
Clarage Fan Co.
General Electric Co., Commercial & Industrial Air Conditioning Dept.
Kennard Corp.
Marlo Coil Co.
McQuay Inc.
Nesbitt, Inc., John J.
Thermal Engineering Corp.
Trane Co., The
Vilter Mfg. Co., The

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE
Acme Industries, Inc.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 36,000 BTU PER HR CAPACITY
Acme Industries, Inc.
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Modine Mfg. Co.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 36,000 BTU PER HR CAPACITY AND OVER
Governair Corp.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET (Self Contained blower, filter, heating coil, humidifier)
Modine Mfg. Co.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET
Drayer-Hanson, Div. of National-U.S. Radiator Corp.
Dunham-Bush, Inc.
Modine Mfg. Co.
Nesbitt, Inc., John J.
Webster & Co., Warren

UNITS, EXHAUSTER, CENTRIFUGAL FAN
Ammerman Co., Inc.
Bishop & Babcock Mfg. Co.

Carnes Corp.
Clarage Fan Co.
Jenn-Air Products Co.
Nesbitt, Inc., John J.
Quickdraft Co.

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING
Eagan Co., Inc., Walter H.

UNITS, HEAT RECOVERY, AIR TO AIR
Therm-O-Wheel, Inc.

UNITS, HEATING AND VENTILATING, HORIZONTAL PACKAGE TYPE
Clarage Fan Co.
Kennard Corp.
Nesbitt, Inc., John J.

UNITS, MIXING, SOUND AND VOLUME CONTROL, FOR DOUBLE DUCT HIGH VELOCITY AIR CONDITIONING SYSTEMS
Buensod-Stacey, Inc.

VALVES, ALTITUDE
Davis Regulator Co.

VALVES, ANGLE
Hammond Brass Works
Henry Valve Co.
Marsh Heating Equipment Co.
R-P & C Valve Div., American Chain & Cable Co., Inc.

VALVES, AUTOMATIC SHUTOFF WITH MANUAL RESET
Davis Regulator Co.

VALVES, BACK PRESSURE
Davis Regulator Co.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS
Marsh Heating Equipment Co.
Sarco Co., Inc.

VALVES, CHECK
American Hard Rubber Co., Div. of Amerace Corp.
Crane Co.
Davis Regulator Co.
Hammond Brass Works
Lunkenheimer Co.
Miller Valve Co., Inc.
Powell Co., Wm., The
Walworth Co.
Williams Gauge Co., Inc., The

VALVES, COMPRESSOR
Vilter Mfg. Co., The

VALVES, DIAPHRAGM
Grinnell Co., Inc.

VALVES, FLOAT
Alco Valve Co.
American Hard Rubber Co., Div. of Amerace Corp.
McDonnell & Miller, Inc.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS
Dunham-Bush, Inc.

VALVES, GATE
Crane Co.
Detroit Controls Div., American Standard Corp.
Hammond Brass Works
Jenkins Bros.
Lunkenheimer Co.
Powell Co., Wm., The
Walworth Co.

VALVES, GLOBE
Crane Co.
Hammond Brass Works
Lunkenheimer Co.
Marsh Heating Equipment Co.
Powell Co., Wm., The
R-P & C Valve Div., American Chain & Cable Co., Inc.
Walworth Co.

VALVES, LINED
American Hard Rubber Co., Div. of Amerace Corp.

VALVES, MIXING, HOT AND COLD WATER
Johnson Service Co.
Sarco Co., Inc.

VALVES, MIXING, HOT AND COLD WATER, THERMOSTATIC
Powers Regulator Co.

VALVES, MIXING, STEAM AND WATER
Johnson Service Co.

VALVES, PLASTIC
American Hard Rubber Co., Div. of Amerace Corp

VALVES, PILOT OPERATED
Sterling, Inc.

VALVES, PLUG
Powell Co., Wm., The

VALVES, PRESSURE REDUCING AND REGULATING
Davis Regulator Co.
Dunham-Bush, Inc.
Fisher Governor Co.
Powers Regulator Co.
Watts Regulator Co.

VALVES, QUICK OPENING
Hammond Brass Works

VALVES, RADIATOR, AIR, FOR HOT WATER RADIATORS
Marsh Heating Equipment Co.

VALVES, RADIATOR, AIR, FOR STEAM RADIATORS
Marsh Heating Equipment Co.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL
Sarco Co., Inc.
Sterling, Inc.

VALVES, RADIATOR, ORIFICE
Dunham-Bush, Inc.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND
Dunham-Bush, Inc.
Hammond Brass Works
Marsh Heating Equipment Co.
Sterling, Inc.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING
Dunham-Bush, Inc.
Marsh Heating Equipment Co.
Sterling, Inc.

VALVES, REFRIGERATION
Alco Valve Co.
Henry Valve Co.
Powers Regulator Co.
Vilter Mfg. Co., The

VALVES, RELIEF, HOT WATER
Davis Regulator Co.
Dunham-Bush, Inc.
Henry Valve Co.
McDonnell & Miller, Inc.
Watts Regulator Co.

VALVES, RELIEF, HYDRAULIC
McDonnell & Miller, Inc.

VALVES, RELIEF, OIL
Davis Regulator Co.

VALVES, SOLENOID
Alco Valve Co.
McDonnell & Miller, Inc.
Mercoid Corp.

VALVES, 2, 3, AND 4 WAY
Henry Valve Co.

VANES, DUCT TURNING
Elgen Mfg. Co.

VENTILATORS, ROOF, FAN
Air Moving & Conditioning Association, Inc.
Aladdin Heating Corp.
Allen Cooler & Ventilator, Inc.
Ammerman Co., Inc.
Bishop & Babcock Mfg. Co.
Carnes Corp.
Clarage Fan Co.
DeBothezat Fans, Div. of American Machine and Metals, Inc.
Gallaher Co., The
Jenn-Air Products Co., Inc.
Peerless Electric Co.
Penn Ventilator Co.
Swartwout Co., The
Trane Co., The

VENTILATORS, ROOF, GRAVITY
Air Devices, Inc.
Allen Cooler & Ventilator, Inc.
Penn Ventilator Co.
Swartwout Co., The

VENTILATORS, ROOF, WITH FUSIBLE LINKS, FOR VENTING PRODUCTS OF COMBUSTION
Swartwout Co., The

VENTILATORS, UNIT, ELECTRIC HEATING ELEMENT
Nesbitt, Inc., John J.

VENTILATORS, UNIT, HOT WATER & STEAM
Trane Co., The

VENTILATORS, WALL, FAN
Jenn-Air Products Co., Inc.
Nesbitt, Inc., John J.

VENTS, RELIEF, AND INTAKE, AIR
Carnes Corp.
Jenn-Air Products Co., Inc.
Waterloo Register Co., Inc.

WASHERS, AIR
Air & Refrigeration Corp.
Buffalo Forge Co.
Clarage Fan Co.

WELDERS, ARC
Hobart Bros. Co.

WELDERS, STUD
Graham Mfg. Corp.

WHEELS, BLOWER
Barry Blower Co.
Torrington Mfg. Co.

WIRE, INSTRUMENT
Chester Cable Corp.

WIRE, OIL BURNER IGNITION
Chester Cable Corp.

WRAP, PIPE
Tapecoat Co., The

WRENCHES, CHAIN, PIPE
Reed Mfg. Co.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRIAL AND ALL OTHER LARGE BUILDINGS
PART 2—ALL PRODUCTS CLASSIFIED

For Complete Addresses See Part 4, p. 140d

ABSORBERS, SHOCK, LIQUID, TO ELIMINATE WATER HAMMER IN PIPING

American Metal Hose Div., The American Brass Co., Waterbury, Conn.
Dormont Mfg. Co., Pittsburgh, Pa.
Finn & Co., Inc., T. R., Hawthorne, N. J.
Greer Hydraulics, Inc., Jamaica, N. Y.
Josam Manufacturing Co., Michigan City, Ind.
Manufacturers Corp., Mansfield, O.
Packless Metal Hose, Inc., Mt. Vernon, N. Y.
Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
United Metal Hose Co., Inc., Long Island City, N. Y.
Vibration Mountings, Inc., Corona, N. Y.
Wade Mfg. Co., Elgin, Ill.
Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

ABSORBERS, SOUND, PREFABRICATED DUCT SECTION, FOR NOISE CONTROL IN DUCT SYSTEMS

Elof Hansson, Inc., Acoustical Div., New York, N. Y.
Industrial Acoustics Co., Inc., New York, N. Y.
Industrial Sound Control Dept. of Koppers Co., Inc., Metal Products Co., Baltimore, Md.

ABSORBERS, VIBRATION

See Hose, Flexible, Metal and Fittings; Bases and Pads, Vibration Isolating; Connectors, Duct, Flexible

ABSORBERS, VIBRATION, FOR REFRIGERANT AND OTHER PIPE LINES

American Metal Hose Div., The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Blaw Knox Co., Power Piping & Sprinkler Div., Pittsburgh, Pa.
Cobra Metal Hose Div., Chicago, Ill.
Finn & Co., Inc., T. R., Hawthorne, N. J.
Flexonics Corp., Maywood, Ill.
Johnson Metal Hose, Inc., Waterbury, Conn.
Korfund Co., Inc., Long Island City, N. Y.
MB Mfg. Co., New Haven, Conn.
Packless Metal Hose, Inc., Mt. Vernon, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Resistoflex Corp., Roseland, N. J.
Saussé & Co., M.W., Los Angeles, Calif.
Seamlex Co., Inc., Long Island City, N. Y.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
United Metal Hose Co., Inc., Long Island City, N. Y.
United States Rubber Co., New York, N. Y.
Vibration Mountings, Inc., Corona, N. Y.
Wade Mfg. Co., Elgin, Ill.
Williamson Co., The, Cincinnati, O.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCESS DOORS AND PANELS

See Doors and Panels, Access

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

Bohn Aluminum & Brass Corp., Detroit, Mich.
Carrier Corp., Syracuse, N. Y.
Dole Refrigerating Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kenmore Machine Products, Inc., Lyons, N. Y.
McQuay, Inc., Minneapolis, Minn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Phillips & Co., H. A., Chicago, Ill.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Research, Inc., Brighton, Mich.
Remco, Inc., Zelienople, Pa.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Corp., Chicago, Ill.
Watkins Co., J. E., Maywood, Ill.
Wolverine Tube, Div. of Calumet & Helca, Inc., Allen Park, Mich.
XL Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

ACOUSTICAL TREATMENT FOR DUCTS

See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems

ADHESIVES, FOR INSULATION OTHER THAN PIPE

Asbestos Asphalt Insulation Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Arno Adhesive Tapes, Inc., Michigan City, Ind.
Atlas Mineral Products Co., Mertztown, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chemical Coatings & Engineering Co., Edgemont, Pa.
Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Dow Corning Corp., Midland, Mich.
Durkee-Atwood Co., Minneapolis, Minn.
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Eagle-Picher Co., Cincinnati, O.
Flintkote Co., The, New York, N. Y.
Formica Corp., The, Cincinnati, O.
Fuller Co. of Calif., H. B., So. San Francisco, Calif.
Gilbreth Co., The, Philadelphia, Pa. (Teflon)
Goodrich Industrial Products Co., B. F., Akron, O.
Grant Wilson, Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich.
Miracle Adhesives Corp., Bellmore, N. Y.
Moore Inc., Goodloe E., Danville, Ill.
Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Rubber & Asbestos Corp., Bloomfield, N. J.
St. Clair Rubber Co., Detroit, Mich.
Stic-Klip Mfg. Co., Inc., Cambridge, Mass.
Taft Jenkins Co., Inc., Holyoke, Mass.

ADHESIVES, FOR PIPE COVERING

Adhesive Products Corp., New York, N. Y.
Arabol Mfg. Co., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Arno Adhesive Tapes, Inc., Michigan City, Ind.
Asbestos Asphalt Insulation Co., Chicago, Ill.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chemical Coatings & Engineering Co., Edgemont, Pa.
Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Durkee-Atwood Co., Minneapolis, Minn.
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Dyfoam Corp., Newcastle, Pa.
Flintkote Co., The, New York, N. Y.
Foster Co., Benjamin, Philadelphia, Pa.
Fuller Co. of Calif., H. B., So. San Francisco, Calif.
Glo-Brite Products Inc., Chicago, Ill.
Grant Wilson, Inc., Chicago, Ill.
Industrial Laminates Div., Fabric Distributing Co., New York, N. Y.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich.
Miracle Adhesives Corp., Bellmore, N. Y.
Moore Inc., Goodloe E., Danville, Ill.
Mystik Adhesive Products, Inc., Chicago, Ill.
National Cork Co., Englewood, N. J.
National Pipe Coatings, Inc., Hungtington Park, Calif.
Pecora Paint Co., Inc., Philadelphia, Pa.
Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Rubber & Asbestos Corp., Bloomfield, N. J.
Ruberoid Co., New York, N. Y.
St. Clair Rubber Co., Detroit, Mich.
Sauereisen Cements Co., Pittsburgh, Pa.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Stic-Klip Mfg. Co., Inc., Cambridge, Mass.
Swift & Co., Chicago, Ill.
Taft Jenkins Co., Inc., Holyoke, Mass.
Tropical Tape Div., Fort Lauderdale, Fla.
Xylos Rubber Co., Akron, O.

ADSORBERS, ODOR

Abbeon Supply Co., Jamaica, N. Y.
Barnebey-Cheney Co., Columbus, O.
Connor Engineering Corp., Danbury, Conn.
Easton R. S. Corp., Brooklyn, N.Y.
Elgin Softener Corp., Elgin, Ill.
Manning Co., Charles E., Pittsburgh, Pa.
Oshkosh Filter & Softener Co., Oshkosh, Wis. (from water supply)
Radex Corp., Chicago, Ill.
Research Products Corp., Madison, Wis.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O.
Williams Chemical Co., New York, N. Y.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alco Products, Inc., Schenectady, N. Y.
American Moistening Co., Providence, R. I.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., West Chester, Pa.

Binks Mfg. Co., Chicago, Ill.
Bury Compressor Co., Erie, Pa.
Buxton Mfg. Co., Dover, N. J.
Centrifix Corp., Cleveland, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co. Inc., Hoboken, N. J.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Doyle and Roth Mfg. Co., Inc., Brooklyn, N. Y.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Joy Mfg. Co., Pittsburgh, Pa.
Manning & Lewis Engineering Co., Newark, N. J.
Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Schramm, Inc., West Chester, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spray Engineering Co., Burlington, Mass.
Wilson Engineering Corp., Chicago, Ill.
Worthington Corp., East Orange, N. J.
Yates-American Machine Co., Heat Transfer Products Div., Beloit, Wis.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., Bronx, N. Y.

AIR AFTERCOOLERS
See Aftercoolers, Compressed Air

AIR TO AIR HEAT RECOVERY UNITS
See Units, Heat Recovery, Air to Air

AIR BREAK FITTINGS
See Fittings, Draining, Fixed Air Break

AIR CLEANERS
See Cleaners, Air, Electrical

AIR COMPRESSORS
See Compressors, Air

AIR CONDITIONERS
See Units, Air Conditioning

AIR CONDITIONING UNITS
See Units, Air Conditioning

AIR CURTAIN, DOORWAYS
See Doorways, Air Curtain, for Large Entrances

AIR DIFFUSERS
See Diffusers, Air; Grilles; Panels Perforated, for Air Diffusion; Registers

AIR ELIMINATORS
See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS
See Compounds, Cleaning, Air Filter

AIR FILTER GAGES
See Gages, Air Filter

AIR FILTERS
See Filters, Air

AIR FRESHENING
See Compounds, Air Freshening; Adsorbers, Odor

AIR HANDLING UNITS
See Units, Exhauster, Centrifugal Fan

AIR OPERATING VALVES
See Valves, Air Operating

AIR PURIFICATION
See Adsorbers, Odor; Compounds, Air Freshening; Lamps, Sterilizing, for Duct Installation

AIR RECOVERY EQUIPMENT
See Adsorbers, Odor

AIR SEPARATORS
See Separators, Air

AIR-TANKLESS WATER HEATERS
See Heaters, Water, Air-Tankless

AIR VALVES
See Valves, Radiators, Air

AIR VELOCITY METERS
See Meters, Air Velocity, Direct Reading; Anemometers

AIR VENTS
See Eliminators, Air

AIR VOLUME METERS
See Meters, Volume, Air and Gas

AIR WASHERS
See Washers, Air

ALARMS, COMBUSTIBLE GAS
Bailey Meter Co., Cleveland, O.
Benjamin Electric Mfg. Co., Des Plaines, Ill. (audible)
Bristol Co., The, Waterbury, Conn.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Hogart Engineering Co., Los Angeles, Calif.
Johnson-Williams Inc., Palo Alto, Calif.
Mine Safety Appliances Co., Pittsburgh, Pa.
Taller & Cooper, Inc., Brooklyn, N. Y.

ALARMS, HIGH AND LOW BOILER WATER
American District Telegraph Co., New York, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Benjamin Electric Mfg. Co., Des Plaines, Ill. (audible)
Copes-Vulcan Div., Blaw Knox Co., Erie, Pa.
Defender Instrument & Regulator Co., Boody, Ill.
Diamond Power Specialty Corp., Lancaster, O.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Econo Products Company, Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Engelhard, Inc., Charles, East Newark, N. J.
Ernst Water Column & Gauge Co., Livingston, N. J.
Fischer & Porter Co., Hatboro, Pa.
Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Schaub Engineering Co., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
Way-Wolff Associates, Inc., New York, N. Y.
Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, HIGH AND LOW FLOW, FOR PIPING SYSTEMS
Benjamin Electric Mfg. Co., Des Plaines, Ill. (audible)
Brooks Rotameter Co., Lansdale, Pa.
Fischer & Porter Co., Hatboro, Pa.
Henzey Co., Watertown, Wis.
Magnetrol, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Rockwood Sprinkler Co., Worcester, Mass.

ALARMS, LIQUID LEVEL, AUDIBLE
American District Telegraph Co., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bristol Co., The, Waterbury, Conn.
Defender Instrument & Regulator Co., Boody, Ill.
Ess Instrument Co., Bergenfield, N. J.
Fischer & Porter Co., Hatboro, Pa.
Healy Ruff Co., St. Paul, Minn.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Kenco Pump Div., American Crucible Products Co., Lorain, O.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
OPW Corp., Cincinnati, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Petrometer Corp., Long Island City, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Ripley Co., Inc., Middletown, Conn.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scully Signal Co., Melrose, Mass.
Uehling Instrument Co., Paterson, N. J.
Way-Wolff Associates, Inc., New York, N. Y.

ALARMS, LIQUID LEVEL, VISUAL
Automatic Control Co., St. Paul, Minn.
Bristol Co., The, Waterbury, Conn.
Econo Products Company, Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Engelhard Inc., Charles, East Newark, N. J.
Fischer & Porter Co., Hatboro, Pa.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Instruments, Inc., Tulsa, Okla.
Magnetrol, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Reliance Gauge Column Co., Cleveland, O.
Uehling Instrument Co., Paterson, N. J.
Way-Wolff Associates, Inc., New York, N.Y.

ALARMS, SMOKE
American District Telegraph Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Benjamin Electric Mfg. Co., Des Plaines, Ill. (audible)
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cardox Corp., Chicago, Ill.
Cleveland Controls, Inc., Cleveland, Ohio
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Defender Instrument & Regulator Co., Boody, Ill.
De-Tec-Tronic Corp., Chicago, Ill.
Edwards, L. V., Rockville Center, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Heat-Timer Corp., New York, N. Y.
Instruments, Inc., Tulsa, Okla.
McNeill Smoke Eliminator Co., Chicago, Ill.
Photobell Co., Inc., New York, N. Y.
Reliance Instruments Mfg. Corp., Glen Cove, Long Island, N. Y.
Ripley Co., Inc., Middletown, Conn.
Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Sterns-Flinn Corp., New York, N. Y.
Way-Wolff Associates, Inc., New York, N. Y.
Worner Electronic Devices, Rankin, Ill.

ALARMS, TEMPERATURE
American District Telegraph Co., New York.
Benjamin Electric Mfg. Co., Des Plaines, Ill. (audible)
Bristol Co., The, Waterbury, Conn.
Burling Instrument Co., Air Conditioning Div., Chatham, N. J.
Custom Mfg. Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
Devco Engineering Inc., Caldwell, N. J.
Econo Products Company, Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., West Orange, N. J.
Fischer & Porter Co., Hatsboro, Pa.

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Thermo Electric Co., Inc., Saddle Brook, N.J.
United Electric Controls Co., Watertown, Mass.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

ALGAE AND SLIME CONTROL, WATER TREATMENT FOR
See Treatment, Water, for Slime and Algae Control

ALUMINUM COATED SHEETS
See Sheets, Aluminum Coated

ALUMINUM PIPE
See Pipe, Aluminum

ALUMINUM SHEETS
See Sheets, Aluminum

ANALYZERS, CARBON DIOXIDE, PORTABLE
Airserco Mfg. Co., Inc., Pittsburgh, Pa. (electrical)
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Cardox Corp., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., East Newark, N. J.
Hays Corp., Michigan City, Ind.
Permutit Co., New York, N. Y.
Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.
Will Corp., Rochester, N. Y.

ANCHORS FOR INSULATION
See Fasteners, Insulation

ANEMOMETERS
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Beckman & Whitley, Inc., San Carlos, Calif.
Dietzgen Co., Eugene, Chicago, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Flow Corp., Arlington, Mass. (Hot wire)
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Hastings-Raydist, Inc., Hampton, Va.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Willson Products Co., Reading, Pa.

ANGLE VALVES
See Valves, Angle

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)
Acme Steel Co., Chicago, Ill. (slotted angle)
Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Atlantic Steel Co., Atlanta, Ga.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn. (aluminum)
Byers Co., A. M., Pittsburgh, Pa.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
Dow Chemical Co., The, Midland, Mich.
Goodrich Industrial Products Co., B. F., Akron, O. (rigid)
Harvey Aluminum, Torrance, Calif.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Kling Bros. Engineering Wks., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Lees Div., John, The Serrick Corp., Muncie, Ind.
Meeker Steel Corp., Geo. L., Evansville, Ind.
Redi-Bolt, Inc., East Chicago, Ind.
Republic Steel Corp., Cleveland, O.
Revere Copper and Brass, Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala.
Truscon Steel Div., Republic Steel Corp., Youngstown, O.
United States Steel Corp., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ANODES FOR CORROSION PROTECTION
See Devices, Electrolytic, for Preventing Corrosion

ANTI-FREEZE COMPOUNDS FOR SNOW MELTING
See Compounds, Anti-Freeze

AQUASTATS
See Thermostats

ARC WELDERS
See Welders, Arc

ARC WELDING ELECTRODES
See Electrodes, Arc Welding

ASBESTOS FIBER AND CEMENT PIPE
See Pipe, Asbestos Fiber and Cement

ASBESTOS MATERIALS
See Insulation

ASBESTOS PACKING
See Packing, Asbestos

ASH CONVEYORS
See Conveyors, Coal and Ash

ASSEMBLIES, MANIFOLD, FOR METERS
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.

ATOMIZING NOZZLES
See Nozzles, Atomizing

ATTENUATOR BOXES, SOUND
See Units, Mixing, Sound and Volume Control, for Double Duct High Velocity Air Conditioning Systems

AXIAL FLOW FANS
See Fans, Axial Flow, Pressure Type

BACKING RINGS
See Rings, Backing, for Pipe Welding

BALANCE CLIPS
See Clips, Balance, Blower Wheel

BALANCING ELBOWS AND TEES, FOR HOT WATER HEATING AND CHILLED WATER SYSTEMS
See Elbows and Tees, Balancing, for Hot Water Heating and Chilled Water Systems

BALANCING EQUIPMENT
See Equipment, Balancing

BALANCING VALVES
See Valves, Balancing

BALL BEARINGS
See Bearings, Ball

BAROMETRIC CONTROLS
See Controls, Draft, Barometric

BARRIERS, VAPOR, FOR BUILDING INSULATION
Alumiseal Corp., New York, N. Y.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Ellis & Watts Products, Inc., Cincinnati, O.
Foster Co., Benjamin, Philadelphia, Pa.
Infra Insulation, Inc., New York, N. Y.
Koppers Co., Inc., Pittsburgh, Pa. (polyethylene film)
Pacific Lumber Co., The, San Francisco, Calif.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y.

BARRIERS, VAPOR, FOR DUCT INSULATION
Alumiseal Corp., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa. (plastic asphalt emulsion)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Foster Co., Benjamin, Philadelphia, Pa.
Infra Insulation, Inc., New York, N. Y.

BARRIERS, VAPOR, FOR PIPE INSULATION
Alumiseal Corp., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa. (plastic asphalt emulsion)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Foster Co., Benjamin, Philadelphia, Pa.
Infra Insulation, Inc., New York, N. Y.
Johns-Manville, New York, N. Y.
Mundet Cork Corp., North Bergen, N. J.
Owens-Corning Fiberglas Corp., Toledo, O.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y.

BASEBOARD RADIATION
See Radiation, Baseboard

BASES, MOTOR, TENSION ADJUSTING
Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Clarage Fan Co., Kalamazoo, Mich.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Reeves Pulley Co., Div. of Reliance Electric & Engineering Co., Columbus, Ind.
Rhoads & Sons, J. E., Wilmington, Del.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

BASES AND PADS, VIBRATION ISOLATING
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Felt Co., Glenville, Conn.
Barry Controls, Inc., Watertown, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Celotex Corp., The, Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Felters Company, The, Boston, Mass.
Finn & Co., Inc., T. R., Hawthorne, N. J.
Flexlock Corp., Kent, O.
General Tire & Rubber Co., Industrial Products Div., Wabash, Ind.
Goodrich Industrial Products Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hobsite Products Co., Harrison, N. J.
Johns-Manville, New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
L.O.F. Glass Fibers Co., Toledo, O.

Lord Mfg. Co., Erie, Pa.
M B Mfg. Co., The, New Haven, Conn.
National Cork Co., Englewood, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J.
Robinson Aviation, Inc., Teterboro, N. J.
Saussé & Co., M.W., Los Angeles, Calif. (cork, rubber-in-shear and spring)
Sponge Products Div., B. F. Goodrich Co., Shelton, Conn.
Spring Packing Corp., Chicago, Ill.
United Cork Companies, Kearny, N. J.
United States Rubber Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Vibration Mountings, Inc., Corona, N. Y.
Western Felt Works, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

BEARINGS, BALL

Aetna Ball & Roller Bearing Co., Div. of Parkersburg-Aetna Corp., Chicago, Ill.
Ahlberg Bearing Co., Chicago, Ill.
Bearings Co. of America, Div. of Federal-Mogul-Bower Bearings, Inc., Lancaster, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Link-Belt Co., Chicago, Ill.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE

Andrew Parts Mfg. Co., Long Island City, N. Y.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Roller Bearing Co. of America, West Trenton, N. J.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.

BEARINGS, PILLOW BLOCK

Ahlberg Bearing Co., Chicago, Ill.
Anti-Friction Bearings Co., Bell Gardens, Calif.
Bearings Co. of America, Div. of Federal-Mogul-Bower Bearings, Inc., Lancaster, Pa.
Boston Gear Works, Quincy, Mass.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Congress Drives Div., Tann Corp., Detroit, Mich.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Goldens' Foundry & Machine Co., Columbus, Ga.
Hewitt-Robins Inc., Stamford, Conn.
Jeffrey Mfg. Co., Columbus, O.
Jones Machinery Div., Hewitt-Robins, Inc., Chicago, Ill.
Lau Blower Co., Dayton, O.
Link-Belt Co., Chicago, Ill.
Marlin-Rockwell Corp., Jamestown, N. Y.
Moraine Products Div., General Motors Corp., Dayton, O.
Randall Graphite Bearings, Inc., Lima, O.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Shafer Bearing, Div. of Chain Belt Co., Downers Grove, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
Triangle Mfg. Co., Oshkosh, Wis.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

Aetna Ball & Roller Bearing Co., Div. of Parkersburg-Aetna Corp., Chicago, Ill.
Andrew Parts Mfg. Co., Long Island City, N. Y.
Berna Co., A. J., Roseville, Mich.
Chain Belt Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Chicago, Ill.
Marlin-Rockwell Corp., Jamestown, N. Y.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, West Trenton, N. J.
Royersford Foundry & Machine Co, Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing, Div. of Chain Belt Co., Downers Grove, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.

BEARINGS, SLEEVE

Ampco Metal, Inc., Milwaukee, Wis.
Bound Brook Oil-less Bearing Co., Bound Brook, N. J.
Bronze Bearings, Inc., Cranford, N. J.
Cleveland Graphite Bronze Co., Div. of Clevite Corp., Cleveland, O.
Climax Metal Products Co., Cleveland, O.
Congress Drives Div., Tann Corp., Detroit, Mich.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Div., Federal-Mogul-Bower Bearings, Inc., Detroit, Mich.
Gatke Corp., Chicago, Ill.
Green Fuel Economizer Co., Inc., The, Beacon, N. Y.
Haveg Industries, Inc., Newark, Del. (plastic)
International Powder Metallurgy, Inc., Ridgway, Pa.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Lau Blower Co., Dayton, O.
Link Belt Co., Chicago, Ill.
Moraine Products Div., General Motors Corp., Dayton, O.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Morrison Products, Inc., Cleveland, O.
Randall Graphite Bearings, Inc., Lima, O.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Whiteley Bearing Corp., Chicago, Ill.

BELLOWS, THERMOSTATIC AND METALLIC

American Boa, Inc., New York, N. Y.
Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Milford, Conn.
Bristol Co., The, Waterbury, Conn.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Cook Electric Co., Chicago, Ill.
Flexonics Corp., Maywood, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Solar Aircraft Co., San Diego, Calif.
Titeflex, Inc., East Springfield, Mass.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
Zallea Bros., Wilmington, Del.

BELTING, FLAT, LEATHER

Alexander Bros., Philadelphia, Pa.
Allen Mfg. Co., W. D. Chicago, Ill.
Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Extremultus, Inc., New York, N. Y.
Graton & Knight Co., Inc., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Rhoads & Sons, J. E., Wilmington, Del.
Schieren Co., Chas. A., Camden, N. J.
Sikes Co., S. R., Minneapolis, Minn.
Sudbury Laboratory, Sudbury, Mass.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER

Armstrong Cork Co., Lancaster, Pa.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hewitt-Robins, Inc., Stamford, Conn.
New York Belting & Packing Co., Passiac, N. J.
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, TOOTH-GRIP OR COG

Dayton Rubber Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind.
Lovejoy Flexible Coupling Co., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELTS, V

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
America Pulley Co., Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Maysville, Ky.
Climax Metal Products Co., Cleveland, O.
Congress Drives Div., Tann Corp., Detroit, Mich.
Dayton Rubber Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Gates Rubber Co., Denver, Colo.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Jones Machinery Div., Hewitt-Robins, Inc., Chicago, Ill.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Maurey Mfg. Corp., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
Pyott Foundry & Machine Co., Chicago, Ill.
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Schieren Co., Chas. A., Camden, N. J.
Sikes Co., S. R., Minneapolis, Minn. (leather)
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., East Orange, N. J.
Zatko Metal Products Co., Euclid, O.

BENDERS, PIPE

American Pipe Bending Machine Co., Inc., Poultney, Vt.
American Pipe Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Burr Oak Tool & Gauge Co., Sturgis, Mich.
Caranth Co., St. Louis, Mo.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Hill, Inc., Walter P., Detroit, Mich.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Lidseen of North Carolina, Inc., Hayesville, N. C.
Milton Equipment Co., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Radiant Devices, St. Louis, Mo.
Sac Tool Mfg. Co., St. Louis, Mo.
Skinner Co., M. B., South Bend, Ind.
Tal Bending Equipment, Inc., Milwaukee, Wis.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.
Wilson Co., K. R., Arcade, N. Y.

BENDERS, TUBING

Blackhawk Mfg. Co., Milwaukee, Wis.

Bonney Forge & Tool Wks., Allentown, Pa.
Buffalo Forge Co., Buffalo, N. Y.
Burr Oak Tool & Gauge Co., Sturgis, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Duro Metal Products Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Hill, Inc., Walter P., Detroit, Mich.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Leonard Precision Products Co., Santa Ana, Calif.
Milton Equipment Co., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Steel City Electric Co., Pittsburgh, Pa.
Tal Bending Equipment, Inc., Milwaukee, Wis.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Wallace Supplies Mfg. Co., Chicago, Ill.
Wilson Co., K. R., Arcade, N. Y.
Wilson Manufacturing Co., Memphis, Tenn.

BENDS, EXPANSION, STEAM PIPE

Alco Products, Inc., Schenectady, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Wood-Ridge, N. J.
Blaw Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Durant Insulated Pipe Co., E. Palo Alto, Calif.
Flori Pipe Co., The, St Louis, Mo.
Gerry Tool Co., The, Bristol, Conn.
Grinnell Co., Inc., Providence, R. I.
Kaiser Co., E. B., Glenview, Ill.
Kellogg Co., M. W., The, New York, N. Y.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Rempe Co., Chicago, Ill.
Ric-wiL, Inc., Barberton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
Taylor Engineering Corp., Detroit, Mich.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Western Piping & Engineering Co., Inc., San Francisco, Calif.
Whitlock Mfg. Co., W. Hartford, Conn.

BENDS, PIPE, RETURN

Crane Co., Chicago, Ill.
Gerry Tool Co., The, Bristol, Conn.
Lewis & Saunders, Lakeport, N. H.
Pittsburgh Nipple Works, Pittsburgh, Pa.
Rittling Corp., The, Buffalo, N. Y.
Roessing Mfg. Co., Pittsburgh, Pa.
Star Tubular Products Co., Chicago, Ill.
Vilter Mfg. Co., The, Milwaukee, Wis.

BI-METALS, THERMOSTATIC

Baker & Co., Inc., Newark, N. J.
Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Wilson Co., H. A., The, Union, N. J.

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aerovent Fan Co., Inc., Piqua, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Alloy Propeller, Zelionople, Pa.
Bertram Co., Harvey P., The, Cincinnati, O.
Bronson Fan Mfg. Corp., Los Angeles, Calif.
Brookside Corp., McCordsville, Ind.
Burden Co., Alan E., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Dayton Rubber Co., Dayton, O.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Frigid, Inc., Brooklyn, N. Y.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
International Engrg. Inc., Dayton, O.
Kody Blower Co., Trenton, N. J.
Koppers Co., Inc., Aeromaster Fan Dept., Baltimore, Md.
Koppers Company, Inc., Metal Products Div., Baltimore, Md.
Lakewood Engineering & Mfg. Co., Chicago.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Myers Electric Co., Inc., Pittsburgh, Pa.
Peerless Electric Co., Warren, O.
Robinson Ventilating Co., Zelienople, Pa.
Schwitzer Corp., Indianapolis, Ind.
South Bend Air Products, Inc., South Bend, Ind.
Torrington Mfg. Co., Torrington, Conn.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Finned, Heating

BLAST HEATING COILS

See Surface, Finned, Heating

BLINDS, LINE, PIPE

Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Hamer Valves, Inc., Long Beach, Calif.
Smith-Blair, Inc., South San Francisco, Calif.
Vernon Tool Co., Ltd., Alhambra, Calit.

BLOCKS, TERMINAL, FOR ELECTRICAL CONNECTIONS

Allen-Bradley Co., Milwaukee, Wis.
Cutler-Hammer, Inc., Milwaukee, Wis.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Kulka Electric Mfg. Co., Inc., Mt. Vernon. N. Y.
Marathon Electric Mfg. Corp., Wausau, Wis.
Pyle-National Co., The, Chicago, Ill.
Sealed Unit Parts Co., Inc., Bronx, N. Y.

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow; and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Wheels, Blower

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

Airfan Engineering Co., Los Angeles, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Barry Blower Co., Minneapolis, Minn.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
Brookside Corp., McCordsville, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
De Laval Steam Turbine Co., Trenton, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elliott Co., Jeannette, Pa.
Fluor Products Co., Whittier, Calif.
General Blower Co., Morton Grove, Ill.
Hauck Mfg. Co., Brooklyn, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Plastic Fabricators, Norwood, Mass. (plastic construction for exhaust and corrosive fumes)
Ingersoll-Rand Co., New York, N. Y.
Jan-Air, Inc., Richmond, Ill.
Joy Mfg. Co., Pittsburgh, Pa.
Kice Metal Products Co., Wichita, Kans.
Lammert & Mann Co., Chicago, Ill.
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
North American Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Power Engineering Corp., Weirton, W. Va.
Research Vacuum Supply Co., Chicago, Ill.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Sutorbilt Corp., Subsidiary of Fuller Co., Compton, Calif.
Torrington Mfg. Co., The, Torrington, Conn.
Trane Co., The, La Crosse, Wis.
Turbo Research Corp., Santa Monica, Calif.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

BLOWERS, SOOT

Airfan Engineering Co., Los Angeles, Calif.
Bate Soot Blower Div., General Blower Co., Inc., Philadelphia, Pa.
Bayer Co., St. Louis, Mo.
Chesterton Co., A. W., Everett, Mass.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Diamond Power Specialty Corp., Lancaster, O.
Marion Machine Foundry Inc., Marion, Ind.

BLOW-OFF VALVES

See Valves, Blow-off

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOARDS, PANEL AND CONTROL

Ace Engineering Co., Chicago, Ill.
Adam Electric Co., Frank, St. Louis, Mo.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Auto-Control Laboratories, Inc., Inglewood, Calif.
Automatic Switch Co., Florham Park, N. J.
Barber-Colman Co., Rockford, Ill.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Burke Engineering, Los Angeles, Calif.
Continental Electric Equipment Co., Cincinnati, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Devco Engineering, Inc., Caldwell, N. J.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Falstrom Co., Passaic, N. J.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hays Corp., Michigan City, Ind.
International Business Machines Corp., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Johns-Manville, New York, N. Y. (asbestos ebony)
Littleford Bros., Inc., Cincinnati, O.
Marsh Instrument Co., Skokie, Ill.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.

Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa.
Powers Regulator Co., Skokie, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Shallcross Controls, Inc., Markesan, Wis.
Square D Co., Detroit, Mich.
Taller & Cooper, Inc., Brooklyn, N. Y.
Trerice Co., H. O., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Whiddett Co., John C., Drexel Hill, Pa.
Will-Burt Co., Orrville, O.

BOILER CLEANING COMPOUNDS

See Compounds, Boiler Cleaning

BOILER FEED PUMPS

See Pumps, Boiler Feed

BOILER FEEDERS

See Feeders, Water, Heating Boiler

BOILER GAGES

See Gages, Liquid Level

BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, ELECTRIC

See Generators, Steam, Electric

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 *Sq Ft Steam Radiation and Over*

American Radiater & Standard Sanitary Corp., New York, N. Y.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bryant, Div. of Carrier Corp., Indianapolis.
Burnham Corp., Irvington, N. Y.
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Hook Mfg. Co., Inc., McDonald (PGH), Pa.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
Nation-U. S. Radiator Corp., Johnstown, Pa.
Peerless Heater Co., The, Div. of the Eastern Foundry Co., Boyertown, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Plumbing Fixtures Div., Rheem Mfg. Co., Metuchen, N. J.
Smith Co., Inc., H. B., The, Westfield, Mass.
Surface Combustion Corp., Toledo, O.
Weil-McLain Co., Michigan City, Ind.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 *Sq Ft Steam Radiation and Over*

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Ajax Boiler & Heater Co., Gardena, Calif.
Aldrich Co., Wyoming, Ill.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Burnham Corp., Irvington, N. Y.
Columbia Boiler Company of Pottstown, Pottstown, Pa.
Combustion Engineering, Inc., New York.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Erie City Iron Wks., Erie, Pa.
Federal Boiler Co., Inc., Midland Park, N. J.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Gabriel Boiler & Fabrication Co., Portland, Ore.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks., East Boston, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
Kewanee Boiler Div., American-Standard, Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Murray Iron Wks. Co., Burlington, Ia.
National-U. S. Radiator Corp., Johnstown, Pa.
Orr & Sembower, Inc., Reading, Pa.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa. (320 sq ft thru 60710 sq ft)
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Reif-Rexoil, Inc., Buffalo, N. Y.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
Spencer Heater, Lycoming Division, Avco Mfg. Corp., Williamsport, Pa.
Stout & Sons, David, St. Louis, Mo.
Struthers Wells Corp., Warren, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Titusville Iron Wks. Co., The, Titusville, Pa.
Viking Mfg. Corp., Cleveland, O.
Western Boiler Co., Los Angeles, Calif.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, TUBELESS

Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Columbia Boiler Company of Pottstown, Pottstown, Pa.
Embassy Steel Products, Inc., Brooklyn, N.Y.
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Viking Mfg. Corp., Cleveland, O.

BOILERS, HEATING, STEEL, WATER TUBE

Ajax Boiler & Heater Co., Gardena, Calif.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Anetsberger Bros., Inc., Northbrook, Ill.
Auburn Burner Co., Auburn, Ind.
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Bigelow Co., The, New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Bryan Steam Corp., Peru, Ind.
Central States Steel Boiler Co., Chicago, Ill.
Columbia Boiler Company of Pottstown, Pottstown, Pa.
Combustion Engineering, Inc., New York, N. Y.
Erie City Iron Wks., Erie, Pa.
International Boiler Wks. Co., The, East Stroudsburg, Pa.
Keeler Co., E., Williamsport, Pa.
Murray Iron Wks. Co., Burlington, Ia.
Nebraska Boiler Company, Inc., Lincoln, Nebr.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Pastushin Industries, Inc., Los Angeles, Calif.
Queen City Engineering Co., Charlotte, N. C.
Raypak Co., Inc., Los Angeles, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rite Engineering & Mfg. Corp., Downey, Calif.
San Gabriel Boiler Mfg. Co., San Gabriel, Calif.
Springfield Boiler Co., Springfield, Ill.
Titusville Iron Works Co., The, Titusville, Pa.
V. & E. Products, Inc., Schuylkill Haven, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
Western Boiler Co., Los Angeles, Calif.
Wickes Boiler Co., Saginaw, Mich.
Zingheim Co., William C., Chicago, Ill.

BOILERS, PACKAGED UNITS, HEATING AND PROCESS—*including Controls, Feed Pump, etc.*

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Ajax Boiler & Heater Co., Gardena, Calif.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Ames Iron Works, Inc., Oswego, N. Y. (10 to 600 bhp)
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Bethlehem Foundry & Machine Co., Bethlehem, Pa. (1.0 to 3.5 gph)
Bigelow Co., The, New Haven, Conn.
Boiler Engineering & Supply Co., Phoenixville, Pa.
Bros Boiler & Mfg. Co., Wm., Minneapolis.
Clayton Mfg. Co., El Monte, Calif.
Cleaver-Brooks Co., Milwaukee, Wis. (oil-gas: 15-60 hp; CB: 15-200 hp; LR: 250-600 hp; oil, gas and combination oil-gas)
Combustion Engineering, Inc., New York, N. Y. (4,000 lb/Hr to 50,000 lb/Hr)
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Cyclotherm Div., National-U. S. Radiator Corp., Oswego, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Erie City Iron Works, Erie, Pa.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Gabriel Boiler Co., Portland, Ore. (3-500 HP)
Hook Mfg. Co., Inc., McDonald (PGH), Pa. (gas fired steam and water, 72,000 Btu to 1,500,000 Btu)
Hydrotherm, Inc., Northvale, N. J.
International Boiler Works Co., East Stroudsburgh, Pa.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.
Kewanee Boiler Div., American-Standard, Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis.
Kresky Mfg. Co., Inc., Petaluma, Calif. (gas, 104,000 & 208,000 Btu per hr input)
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Leffel & Co., James, Springfield, O.
Littleford Bros., Inc., Cincinnati, O.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn. (3 hp thru 80 hp — oil or gas)
Martin Co., Inc., J. O., San Francisco, Calif.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Murry Iron Works Co., Burlington, Ia.
Nebraska Boiler Co., Inc., Lincoln, Nebr.
Orr & Sembower, Inc., Reading, Pa.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa. (320 sq ft thru 60,710 sq ft oil or gas 15 psig steam, 30 psig water)
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif. (1½ Hp - 125 Hp. Pressure to 200 psi. Gas, oil and combination firing)
Pastushin Industries, Inc., Los Angeles, Calif.
Petro, Cleveland, O. (up to 450 hp gas, oil and combination; high pressure)
Preferred Utilities Mfg. Corp., New York. (20 to 600 boiler hp. Design pressure from 15 to 250 psi. All grades of oil and gas or combination gas and oil)
Queen City Engineering Co., Charlotte, N. C. (300 to 17,500 lb of steam per hr; to 250 psi)
Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rite Engineering & Mfg. Corp., Downey, Calif.
SelecTemp Div., Iron Fireman Mfg. Co., Cleveland, O. (114,000 to 1,000,000 Btu gas or oil)
Sellers Engineering Co., Chicago, Ill.
Springfield Boiler Co., Springfield, Ill. (6,000 to 54,000 lb per hr, 200 to 900 psig, gas & oil fired)
Stout & Sons, David, St. Louis, Mo. (up to 280,000 sq ft EDR; up to 250 psig; gas and oil fuels)
Struthers Wells Corp., Warren, Pa.
Superior Combustion Industries, Inc., New York, N. Y. (fire tube 20-600 hp to 250 psi, oil, gas or both; water tube 8000 to 50,000 lb per hr., oil, gas or both)
Texsteam Corp., Houston, Tex.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Heating Corp., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky. (10,000 to 40,000 lb of steam per hr capacities)
Way-Wolff Associates, Inc., New York, N. Y.
Western Boiler Co., Los Angeles, Calif.
Wickes Boiler Co., Saginaw, Mich.
York-Shipley, Inc., York, Pa.

BOILERS, PORTABLE, STEAM FOR STEAM CLEANING, MISCELLANEOUS PROCESS, OTHER USES

Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Lattner Mfg. Co., P. M., Cedar Rapids, Ia.
Leffel & Co., James, Springfield, O.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Murray Iron Wks. Co., Burlington, Ia.
Nebraska Boiler Co., Inc., Lincoln, Nebr.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Pastushin Industries, Inc., Los Angeles, Calif.
Texsteam Corp., Houston, Tex.
Vapor Heating Corp., Chicago, Ill.

BOLTS, EXPANSION

Arro Expansion Bolt Co., Marion, O.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood. N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Harper Co., H. M., Morton Grove, Ill.
Holub Industries, Inc., Sycamore, Ill.
Industrial Screw Co., Chicago, Ill.
Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
National Lead Co., New York, N. Y.
Paine Co., Addison, Ill.
Phillips Drill Co., Michigan City, Ind.
Polis Mfg. Co., J. D., Chicago, Ill.
Rawlplug Co., Inc., The, New Rochelle, N. Y
Star Expansion N. Y., Inc., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., Cambridge, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
Continental Screw Co., New Bedford, Mass
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Morton Grove, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Phoell Mfg. Co., Chicago, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.
Redi-Bolt, Inc., East Chicago, Ind.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Purdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Victor Products Corp., Chicago, Ill.
Wolfe Co., Franklin C., Culver City, Calif.

BOLTS, TOGGLE AND ANCHOR

Arro Expansion Bolt Co., Marion, O.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., Cambridge, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood. N. J.
Fastway Fasteners, Inc., Lorain, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Holub Industries, Inc., Sycamore, Ill.
Huck Mfg. Co., Detroit, Mich.
Industrial Screw Co., Chicago, Ill.
Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Modern Hanger Corp., The, Cleveland, O.
Moore, Inc., Goodloe E., Danville, Ill.
Paine Co., Addison, Ill.
Phillips Drill Co., Michigan City, Ind.
Polis Mfg. Co., J. D., Chicago, Ill.
Rawlplug Co., Inc., The, New Rochelle, N. Y.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Star Expansion N. Y., Inc., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.
Western Wire Products Co., St. Louis, Mo (flattened lag)

BOLTS, "U"

Allmetal Screw Products Co., Inc., Garden City, Long Island, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., Cambridge, Mass.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Harper Co., H. M., Morton Grove, Ill.
Lamson & Sessions Co., The, Cleveland, O.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Modern Hanger Corp., The, Cleveland, O.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Steel City Electric Co., Pittsburgh, Pa.
U. S. Expansion Bolt Co., York, Pa.

BOOSTERS, GAS

Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Joy Mfg. Co., Pittsburgh, Pa.
Leiman Bros., Inc., Newark, N. J.
North American Mfg. Co., Cleveland, O.
Research Vacuum Supply Co., Chicago, Ill.
Roots-Connersville Blower, Div. of Dresser Industries, Inc, Connersville, Ind.

BOOTHS, PAINTING, SPRAY

Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Livingston, N. J.
Burdett Mfg. Co., Chicago, Ill.
Carolina Blower Co., Inc., Greensboro, N. C.
Centri-Spray Corp., Livonia, Mich. (wet type)
David-Ludwig Co., Detroit, Mich.
DeVilbiss Co., The, Toledo, O.
Goethel Sheet Metal Works, Inc., Alfred, Milwaukee, Wis.
Griffin & Co., Louisville, Ky.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
M & E Mfg. Co., Indianapolis, Ind.
Mahon Co., R. C., The, Detroit, Mich.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Plummer Spray Equipment Co., Napolean. O.
Ramco Equipment Corp., New York, N. Y.
Schmieg Industries, Inc., Detroit, Mich.
Spray Engineering Co., Burlington, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
St. Louis Tool Co., St. Louis, Mo.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Auburn Machine Works, Inc., Auburn, Neb.
Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The Solon, O.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Crane & Eng. Co., Wickliffe, O.
Diamond Machine Tool Co., Pico, Calif.
Dreis & Krump Mfg. Co., Chicago, Ill.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Verson Allsteel Press Co., Chicago, Ill.
Verson Mfg. Co., The, Dallas, Tex.
Whitney Metal Tool Co., Rockford, Ill.
Wilson Co., K. R., Arcade, N. Y. (Hydraulic)

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING ALLOYS

See Solder (Silver), Brazing Alloys and Fluxes

BRAZING TORCHES

See Torches, Brazing

BREAKERS, VACUUM (For Steam Using Equipment)

Associated Valve & Engineering Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Foster Engineering Co., Union, N. J.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
McAlear Mfg. Co., Chicago, Ill.
Perfecting Service Co., Charlotte, N. C.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Simplex Valve & Meter Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Adams Mfg. Co., Cleveland, O.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Aston Products, Inc., Hazel Park, Mich.
Auburn Burner Co., Edgerton, O.
Auburn Foundry Inc., Heating Div., Auburn, Ind.
Automatic Corp., St. Louis, Mo.
Barber Mfg. Co., Cleveland, O.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Burdett Mfg. Co., Chicago, Ill.
Century Engineering Corp., Cedar Rapids, Ia.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Coppus Engineering Corp., Worcester, Mass.
Dalzen Mfg. Co., St. Clair, Mich.
Downing Steel Products, Dayton, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Engineer Co., New York, N. Y.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
Fuelguard Co., Dallas, Tex.
Gordon & Piatt, Inc., Winfield, Kan.
Haney Gas Burner & Engineers, Inc., Monrovia, Calif.
Hastings Air Control, Inc., Omaha, Nebr.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Jackson & Church Co., Saginaw, Mich.
Jamieson Mfg. Co., Dallas, Tex.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, O.
Johnson Co., S. T., Oakland, Calif.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Laharco Industries, Minneapolis, Minn.
Lattner Mfg. Co., P. M., Cedar Rapids, Ia.
Leahy Mfg. Co. Los Angeles, Calif.
Lennox Industries, Inc., Marshalltown, Ia.
Lientz Co., B. P., Kansas City, Mo.
Martin Co., Inc., J. O., San Francisco, Calif.
Maxon Premix Burner Co., Muncie, Ind.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago Ill.
National Airoil Burner Co., Inc., Philadelphia Pa.

Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., The, Rock Island, Ill.
Orr & Sembower, Inc., Reading, Pa.
Peabody Engrg. Corp., New York, N. Y.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Petro, Cleveland, O.
Power-Flame Div., Inc., Grandview, Mo.
Radiant Heat & Cooling Co., Santa Clara, Calif.
Ransome Co., Emeryville, Calif.
Ray Oil Burner Co., San Francisco, Calif.
Rayfield-Staffco Burner Co., Chicago, Ill.
Reif-Rexoil, Inc., Buffalo, N. Y.
Research Vacuum Supply Co., Chicago, Ill.
Riley Stoker Corp., Worcester, Mass.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Schurs Oil Burner Co., Los Angeles, Calif.
Sellers Engineering Co., Chicago, Ill.
Sonner Burner Co., Winfield, Kan.
Standard Fuel Engineering Co., Detroit, Mich.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
Superior Combustion Industries, Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Synchronous Flame, Inc., Walworth, Wis.
Timken Silent Automatic Div., Rockwell Spring & Axle Co., Jackson, Mich.
Todd Shipyards Corp., Products Div., Brooklyn, N. Y.
Vacuum Gas Burner, Olean, N. Y.
Webster Engineering Co., Tulsa, Okla.
Williams Div., Eureka Williams Corp., Bloomington, Ill.
Wisconsin Burners Inc., Madison, Wis.
York-Shipley, Inc., York, Pa.
Zink Co., John, Tulsa, Okla.
Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL, COMBINED WITH STOKER OR OVER COAL GRATES

Barber Mfg. Co., Cleveland, O.
Engineer Co., New York, N. Y.
Forney Engineering Co., Dallas, Tex.
Gordon & Piatt, Inc., Winfield, Kan.
Iron Fireman Mfg. Co., Cleveland, O.
Jackson & Church Co., Saginaw, Mich.
Lientz Co., B. P., Kansas City, Mo.
Maxon Premix Burner Co., Muncie, Ind.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
Norman Products Co., Columbus, O.
Riley Stoker Corp., Worcester, Mass.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Webster Engineering Co., Tulsa, Okla.

BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill.
Automatic Corp., St. Louis, Mo.
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill
Engineer Co., New York, N. Y.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
Gordon & Piatt, Inc., Winfield, Kan.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Oakland, Calif.
Lammert & Mann Co., Chicago, Ill.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
Maxon Premix Burner Co., Muncie, Ind.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National-U. S. Radiator Corp., Johnstown, Pa.
North American Mfg. Co., Cleveland, O.
Orr & Sembower, Inc., Reading, Pa.
Peabody Engineering Corp., New York, N. Y.
Petro, Cleveland, O.
Power-Flame Div., Inc., Grandview, Mo.
Preferred Utilities Mfg. Corp., New York.
Ray Oil Burner Co., San Francisco, Calif.
Rayfield-Staffco Burner Co., Chicago, Ill.
Riley Stoker Corp., Worcester, Mass.
Roberts-Gordon Appliance Co., Buffalo, N. Y.
Rockwell Co., ,W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Simplex Oil Heating Corp., Philadelphia, Pa.
Sonner Burner Co., Winfield, Kan.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Superior Combustion Industries, Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Synchronous Flame, Inc., Walworth, Wis.
Todd Shipyards Corp., Products Div., Brooklyn, N. Y.
Webster Engineering Co., Tulsa, Okla.
York-Shipley, Inc., York, Pa.
Zink Co., John, Tulsa, Okla.

BURNERS, NATURAL AND LP GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Burdett Mfg. Co., Chicago, Ill.
Century Engineering Corp., Cedar Rapids, Ia.
Gordon & Piatt, Inc., Winfield, Kans.
Hauck Mfg. Co., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kresky Mfg. Co., Petaluma, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
Mutual Liquid Gas & Equipment Co., Gardena, Calif.
Norman Products Co., Inc.. Columbus, O.
Power-Flame Div., Inc., Grandview, Mo.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Sonner Burner Co.. Winfield. Kans.
Stout & Sons. David, St. Louis, Mo.
Synchronous Flame, Inc., Walworth, Wis.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

ABC-Federal Oil & Burner Co., Inc., Philadelphia, Pa. (rotary)
Ace Engineering Co., Chicago, Ill. (Rotary)
Aldrich Co., Wyoming, Ill.
American Radiator & Standard Sanitary Corp., New York, N. Y. (high pressure)
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Automatic Burner Corp., Chicago, Ill. (high pressure)
Automatic Corp., St. Louis, Mo. (high pressure gun type)
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Beckett Corp., R. W., Elyria, O. (high pressure)
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Carlin Co., The, Wethersfield, Conn.
Century Engrg. Corp., Cedar Rapids, Ia. (high pressure atomizing)
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co.. San Francisco, Calif.
Drying System Co., Chicago, Ill. (medium pressure atomizing)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eds-Wil Burner Corp., Chicago, Ill.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J. (high pressure atomizing)
Engineer Co., New York, N. Y.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., San Francisco, Calif. (rotary)
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex. (both steam atomizing & mechanical, high pressure)
Gilbert & Barker Mfg. Co., West Springfield, Mass. (high pressure atomizing)
Haney Gas Burner & Engineers, Inc., Monrovia, Calif. (steam atomizing)
Hardinge Oil Burner & Mfg. Co., Chicago, Ill.
Hauck Mfg. Co., Brooklyn, N. Y. (low pressure air type and high pressure steam type)
Ingersoll Conditioned Air Div., Borg-Warner Corp., Kalamazoo, Mich.
Iron Fireman Mfg. Co., Cleveland, O. (Rotary atomizing, high pressure atomizing)
Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Oakland, Calif. (high pressure atomizing; horizontal rotary)
Kol-Master Corp., Oregon, Ill. (high pressure)
Kresky Mfg. Co., Inc., Petaluma, Calif. (hi-pressure atomizing; also forced-draft vaporizing retort-type)
Lammert & Mann Co., Chicago, Ill. (low pressure air or steam atomization)
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y. (horizontal rotary-belt & direct)
Leahy Mfg. Co., Los Angeles, Calif.
Lennox Industries, Inc., Marshalltown, Ia. (high pressure)
Lientz Co., B. P., Kansas City, Mo. (steam atomizing)
Maxon Premix Burner Co., Muncie, Ind.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif. (high pressure atomizing and steam atomizing)
Montag Inc., Portland, Ore.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa. (low pressure, high pressure, steam rotary)
National Oil Burner Co. of N. Y. Inc., Brooklyn, N. Y. (horizontal rotary)
North American Mfg. Co., Cleveland, O. (low & high pressure atomizing; steam atomizing; variable capacity)
Nu-Way Corp., The, Rock Island, Ill.
Orr & Sembower, Inc., Reading, Pa. (air-atomizing) (Capacity range: 15 hp-500 hp. Fuels: Light oil, heavy oil or gas or any combination of these.)
Peabody Engrg. Corp., New York, N. Y.
Petro, Cleveland, O. (high pressure and rotary atomizing)
Preferred Utilities Mfg. Corp., New York, N. Y., (Rotary types; from 7½ gph to 175 gph.)
Ray Oil Burner Co., San Francisco, Calif. (High pressure atomizing rotary)
Rayfield-Staffco Burner Co., Chicago, Ill. (low pressure atomizing and horizontal rotary)
Reif-Rexoil, Inc., Buffalo, N. Y. (high pressure atomizing .50 to 30 gph. No. 2 oil plus horizontal rotary heavy oil from 2 to 165 gph.)
Riley Stoker Corp., Worcester, Mass.
Rockwell Co., W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Simplex Oil Heating Corp., Philadelphia, Pa. (Low and high pressure atomizing, and horizontal rotary types)
Staples & Pfeiffer, San Francisco, Calif. (High pressure and steam atomizing, variable capacity)
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind. (low and high pressure)
Stout & Sons, David, St. Louis, Mo.
Sun-Ray Burner Mfg. Corp., Jamaica, N. Y. (high pressure)
Superior Combustion Industries, Inc., New York, N. Y. (rotary)
Synchronous Flame, Inc., Walworth, Wis. (High pressure atomizing)
Timken Silent Automatic Div., Rockwell Spring & Axle Co., Jackson, Mich.
Todd Shipyards Corp., Products Div., Brooklyn, N. Y. (Variable capacity, rotary, pressure atomizing, steam atomizing)
Utah Hydro Corp., Salt Lake City, Utah
Weatherall Engineers, Inc., Providence, R. I.
Webster Engineering Co., Tulsa, Okla.
Williams Div., Eureka Williams Corp., Bloomington Ill.
Wisconsin Burners Inc., Madison, Wis.
York-Shipley, Inc., York, Pa. (Rotary, high pressure atomizing)
Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Combustion Engineering Inc., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Combustion Engineering Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Combustion Engineering Inc., New York, N. Y.
Engineer Co., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Combustion Engineering Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CABINETS FOR AIR CONDITIONERS, BOILERS, ETC.

See Parts For Heating and Air Conditioning Equipment

CABLE, ELECTRIC HEATING

Ceilheat, Inc., Knoxville, Tenn.
Chester Cable Corp., Chester, N. Y.
Crystalheat Co., Van Nuys, Calif.
Dixie Raydiant Electric Heat Corp., Atlanta, Ga.
Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
Everwarm, Inc., Knoxville, Tenn.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
General Electric Co., Wiring Device Dept., Providence, R. I.
Miller Mfg. Co., St. Paul, Minn.
Modernheat Cable Corp., Kingsport, Tenn.
Nelson Electric Mfg. Co., Tulsa, Okla.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rentip, Inc., Knoxville, Tenn.
Roberson Inc., Seattle, Wash.
S & C Mfg. Co., Cincinnati, O.
Sunwarm, Inc., Kingsport, Tenn.
Tennessee Plastics, Inc., Johnson City, Tenn.
Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wrap-On Co., Chicago, Ill.

CABLE AND WIRE, THERMOSTAT

Chester Cable Corp., Chester, N. Y.
Crystalheat Co., Van Nuys, Calif.
Gavitt Wire & Cable Co., Div. of American Hard Rubber Co., Brookfield, Mass.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Roberson Inc., Seattle, Wash.
United States Rubber Co., New York, N. Y.
Wiegand Co., Edwin L., Pittsburgh, Pa.

CALCULATORS, AIR CONDITIONING, HEATING, VENTILATING, AND PIPING; SLIDE RULE

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Instrument Co., Inc., Silver Spring, Md. (psychrometric calculator)
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O.
Calculator Specialties Co., Chicago, Ill.
Caliputer, Rancho Sante Fe, Calif.
Graphic Calculator Co., Chicago., Ill.
Morton Engineering Service, Paul S., Kalamazoo, Mich. (Btu calculator, area and volume calculator. Area and crackage calculator, Btuh calculator. Heat loss calculation & data sheets — padded. Electrical heat load, air duct)

CANOPIES, METAL, SUN, REFLECTING

Air Control Products, Inc., Coopersville, Mich.
American Warming & Ventilating Co., Toledo, O.
Hunter Douglas Aluminum Div., Bridgeport Brass Co., New York, N. Y.
Kawneer Co., Niles, Mich.

CAPACITORS, ELECTRICAL, FOR POWER FACTOR CORRECTION

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Electric Co., Capacitor Dept., Hudson Falls, N. Y.
Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Mallory & Co., Inc., P. R., Indianapolis, Ind.
Potter Co., The, North Chicago, Ill.
Sprague Electric Co., North Adams, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.

CAPILLARY TUBING

See Tubing, Capillary

CAPS, VENT FLUE

Accurate Sheet Metal & Mfg. Works, Chicago, Ill.
Acme Mfg. Co., Philadelphia, Pa.
Adams Co., The, Dubuque, Iowa
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Airjet Ventilator Co., San Clemente, Calif.
Ammerman Co., Inc., Minneapolis, Minn.
Binks Mfg. Co., Chicago, Ill.
Boston Machine Works Co., Lynn, Mass.
Breidert Co., G. C., San Fernando, Calif.
Champion Furnace Pipe Co., Peoria, Ill.
Coleman Co., Inc., The, Wichita, Kan.
Corbman Bros., Inc., Philadelphia, Pa.
Enderle, Inc., Ltd., Frank X., Los Angeles, Calif.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Mirror Patented Stove Pipe Co., Hartford, Conn.
Ohio Foundry & Mfg. Co., Steubenville, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Penn Ventilator Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Robinson Clay Products Co., The, Akron, O.
Walker Mfg. & Sales Co., St. Joseph, Mo.
Wallace Co., William, Metalbestos Div., Belmont, Calif.
Waverly Heating Supply Co., Beverly, Mass.
Wood Mfg. Co., A. R., Luverne, Minn.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON MONOXIDE DETECTORS

See Detectors, Carbon Monoxide

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon and Graphite

CAST IRON PIPE

See Pipe, Cast Iron

CATALOG HOLDERS AND FILES

See Holders and Files, Catalog, for Engineers' and Contractors' Offices

CEILINGS, RADIANT HEATING AND COOLING, AND ACOUSTICAL CONTROL

Also see Coils and Panels, Radiant Heating and Cooling, Prefabricated

Burgess-Manning Co., Architectural Products Div., Chicago, Ill.
Multi-Vent Div., Pyle National Co., The, Chicago, Ill.
Simplex Ceiling Corp., New York, N. Y.

CEMENT AND COMPOUNDS, PIPE JOINT

Acorn Refining Co., Cleveland, O.
American Sealants Co., Hartford, Conn.
Arco Co., The, Cleveland, O.
Armite Laboratories, Los Angeles, Calif.
Atlas Mineral Products Co., Mertztown, Pa.
Babbitt Chemical Co., New Bedford, Mass.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Baso, Inc., Milwaukee, Wis.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Black & White Chemical Co., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Gasket Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Crane Packing Co., Morton Grove, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Flexrock Co., Philadelphia, Pa.
Flick-Reedy Corp., Melrose Park, Ill.
Garlock Packing Co., Palmyra, N. Y.
Gasoilair Equipment Co., New Haven, Conn.
Gilbert & Barker Mfg. Co., West Spring, Mass.
Gilbreth Co., The, Philadelphia, Pa.
Goodrich Industrial Products Co., B. F., Akron, O.
Greene, Tweed & Co., North Wales, Pa.
Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Highside Chemicals, Inc., Clifton, N. J.
Horn Co., Inc., A. C., Subsidiary of Sun Chemical Corp., Long Island City, N. Y.
Industrial Plastic Fabricators, Norwood, Mass.
Jet-Lube, Inc., Burbank, Calif.
Johns-Manville, New York, N. Y.
Kenite Laboratory, Madison, N. J.
Lake Chemical Co., Chicago, Ill.
Macksons Co., New York, N. Y.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Montgomery Bros., San Francisco, Calif.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Rectorseal Div., Rector Well Equipment Co., Houston, Tex.
Robinson Clay Product Co., The, Akron, O.
Rubber Products Div., Parker-Hannifin Corp., Cleveland, O.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Sexauer Mfg. Co., Inc., J. A., New York, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Spring Packing Corp., Chicago, Ill.
Sulflo, Inc., Elizabeth, N. J.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
Tube Turns Plastics, Inc., Louisville, Ky. (PVC pipe)
United States Stoneware Co., New York, N. Y.
W-K-M Mfg. Co., Div. of ACF Industries, Inc., Houston, Tex.
Whitlam Mfg. Co., J. C., Wadsworth, O.
Wilhelm Co., A., Reading, Pa.
X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Asbestos Asphalt Insulation Co., Chicago, Ill.
Babcock & Wilcox Co., Boiler Div., New York, N. Y.

Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Dick-Armstrong-Pontius, Inc., Detroit, Mich.
France Refractories Co., J. H., Snow Shoe, Pa.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
Johns-Manville, New York, N. Y.
Lastik Products Co., Inc., Pittsburgh, Pa.
Nebel Mfg. Co., Cleveland, O.
Nicolet Industries, Inc., Hamilton, O.
Norton Co., Worcester, Mass.
Pecora Paint Co., Inc., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Plibrico Co., Chicago, Ill.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Roto Corp., Walled Lake, Mich.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Smooth-On Mfg. Co., Jersey City, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Taylor Sons Co., Charles, Cincinnati, O.

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Asbestos Asphalt Insulation Co., Chicago, Ill.
Atlas Mineral Products Co., Mertztown, Pa.
Baldwin-Hill Co., Trenton, N. J. (mineral wool)
Bigelow Liptak Corp., Detroit, Mich.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fibreboard Paper Products Corp., San Francisco, Calif.
France Refractories Co., J. H., Snow Shoe, Pa.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (85 per cent magnesia)
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Moore, Inc., Goodloe E., Danville, Ill.
Mortell Co., J. W., Kankakee, Ill.
Mundet Cork Corp., North Bergen, N. J.
Munn and Steele, Inc., South Boston, Mass.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Nicolet Industries, Inc., Hamilton, O.
Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa.
North American Asbestos Corp., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plibrico Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
Sauereisen Cements Co., Pittsburgh, Pa.
Smith & Kanzler Corp., Linden, N. J.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Stic-Klip Mfg. Co., Inc., Cambridge, Mass.
United States Mineral Wool Co., Stanhope, N. J.
Zonolite Co., Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CERAMIC PIPE

See Pipe, Stoneware

CHAIN DRIVES

See Drives, Chain

CHAMBERS, COMBUSTION, PREFORMED

Armstrong Cork Co., Lancaster, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Bemco, Inc., North Hollywood, Calif.
Boston Machine Works Co., Lynn, Mass.
France Refractories Co., J. H., Snow Shoe, Pa.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
Lindy Heaters, Inc., New York, N. Y.
Monogram Products Co., Inc., Philadelphia, Pa.
Munn & Steele, Inc., South Boston, Mass.
Oil Equipment Mfg. Corp., New Haven, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Rex Roto Corp., Walled Lake, Mich.
S. O. S. Products Co., Inc., Brooklyn, N. Y.

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Anetsberger Brothers, Inc., Northbrook, Ill.
Drying Systems Co., Chicago, Ill.
Reco Products Div., Recony Corp., New York, N. Y.
Sub-Zero Freezer Co., Inc., Madison, Wis.
Tenney Engineering, Inc., Union, N. J.
Thompson Research & Mfg. Co., Davenport, Fla.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

CHANGERS, SPEED, HYDRAULIC COUPLING

American Blower Corp., Detroit, Mich.
CraneVeyor Corp., Los Angeles, Calif.
Reuland Electric Co., Alhambra, Calif. (combined electric motor and fluid drive coupling)
Twin Disc Clutch Co., Rockford, Ill.

CHANGERS, SPEED, MAGNETIC

Allis Co., Louis, The, Milwaukee, Wis.
Doerr Electric Corp., Cedarburg, Wis.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Dynamic Div. of General Dynamics Corp., Bayonne, N. J.
Janette Electric Mfg. Co., Morton Grove, Ill.

CHANGERS, SPEED, MECHANICAL

Abart Gear & Machine Co., Chicago, Ill.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, The, Milwaukee, Wis.
American Flexible Coupling Div., Zurn Industries, Inc., Erie, Pa. (synchronizing friction clutch)
Boston Gear Works, Quincy, Mass.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Cleveland Worm & Gear Co., Cleveland, O.
Custanite Corp., Brooklyn, N. Y.
DoAll Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Doerr Electric Corp., Cedarburg, Wis.
Driv-Way Lite Co., Denver, Colo.
Graham Transmissions, Inc., Menomonee Falls, Wis.
Horton Mfg. Co., Inc., Minneapolis, Minn.
Lewellen Mfg. Co., Columbus, Ind.
Lima Electric Motor Co., Inc., The, Lima, O.
Link Belt Co., Chicago, Ill.
Master Electric Co., Dayton, O.
Maurey Mfg. Corp., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Reeves Pulley Co., Div. of Reliance Electric & Engineering Co., Columbus, Ind.
Reliance Electric & Engineering Co., Cleveland, O. (electrical & mechanical drives)
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Speed Selector Inc., Chagrin Falls, O.
Steam Turbine Div., Worthington Corp., Wellsville, N. Y.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Woods Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., East Orange, N. J.

CHASERS, PIPE AND BOLT

Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

CHASERS, THREADING DIE

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Erie Tool Works, Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Nye Tool Co., Chicago, Ill.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

CHECK VALVES

See Valves, Check

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

Acme Industries, Inc., Jackson, Mich.
Alstrom Corp., New York, N. Y.
American Coils Co., Farmingdale, N. J.
Arkla Air Conditioning Corp., Evansville, Ind.
Armstrong Co., Richard M., West Chester, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cool-Ette, Inc., Detroit, Mich.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Dole Refrigeratng Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Heat-Exchangers, Inc., Chicago, Ill.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Hydrotherm, Inc., Northvale, N. J.
Kennard Corp., St. Louis, Mo.
King Zeero Co., The, Chicago, Ill.
Kritzer Radiant Coils, Inc., Batavia, Ill.
National-U.S. Radiator Corp., Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Process Engineering, Inc., Methuen, Mass.
Reco Products Div., Recony Corp., New York, N. Y.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Cranston, R. I.
Temprite Products Corp., Dept HPAC, Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Typhoon Heat Pump Co., Div. of Hupp Corp., Tampa, Fla.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
Vic Mfg. Co., Minneapolis, Minn.
Vilter Mfg. Co., The, Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.

Weather King of Florida, Inc., Orlando, Fla.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Whitlock Mfg. Co., W. Hartford, Conn.
Worthington Corp., East Orange, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Yula Water Heaters, Inc., Bronx, N. Y.

CHILLERS, WATER, PACKAGED

See Compressors, Refrigerating, Combined with Condenser, Water Chiller, Piping Connections and Controls

CHIMNEYS, PREFABRICATED

See Stacks and Chimneys, Industrial, Prefabricated

CHLORINATORS, WATER

Aquatrol Ferr-X Corp., Clifton, N. J.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Clayton Mark & Co., Evanston, Ill.
Culligan, Inc., Northbrook, Ill.
Dearborn Chemical Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Wallace & Tiernan Inc., Belleville, N. J.

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Bell & Gossett Co., Morton Grove, Ill.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Columbus Steam Pump Works Co., Columbus, O.
Dayton Electric Mfg. Co., Chicago, Ill.
Dunham-Bush, Inc., Hartford, Conn.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Fostoria Pressed Steel Corp., **Magnetic Pump Div., Fostoria, O.**
Hoffman Specialty Mfg. Corp., Indianapolis.
Kehm Corp., The, Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Metalmaster Corp., Newark, N. J.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Quality Specialty Co., Inc., Camden, N. J.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Weil Pump Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.

CLAMPS, BEAM, PIPE HANGING

Blaw Knox Co., Power Piping & Sprinkler Div., Pittsburgh, Pa.
Carpenter & Paterson, Inc., Cambridge, Mass.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Frick Co., Waynesboro, Pa.
Gateway Engineering Co., Chicago, Ill.
Globe Products, Huppower Div., Hupp Corp., Detroit, Mich.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Providence, R. I.
Holub Industries, Inc., Sycamore, Ill.
Industrial Tubular Equipment Co., North Hollywood, Calif.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Modern Hanger Corp., The, Cleveland, O.
Moore, Inc., Goodloe E., Danville, Ill.
Mult-A-Frame Div., Ainsworth Mfg. Corp., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Addison, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Steel City Electric Co., Pittsburgh, Pa.
Unistrut Products Co., Chicago, Ill.

CLAMPS, HOSE

Allen Mfg. Co., W. D., Chicago, Ill.
Binks Mfg. Co., Chicago, Ill.
Breeze Corporations, Inc., Union, N. J.
Chicago Pneumatic Tool Co., New York, N. Y.
Circle Clamp Corp., New York, N. Y.
Continental Rubber Wks., Erie, Pa.
Crane Co., Chicago, Ill.
Flexible Tubing Corp., Guilford, Conn.
Goodall Rubber Co., Trenton, N. J.
Hansen Mfg. Co., Cleveland, O.
Holub Industries, Inc., Sycamore, Ill.
Ideal Corp., Brooklyn, N. Y.
LE-HI Div., Hose Accessories Co., Philadelphia, Pa.
Manufacturers Corp., Mansfield, O.
Marman Div., Aeroquip Corp., Los Angeles, Calif.
Punch-Lok Co., Chicago, Ill.
Research Vacuum Supply Co., Chicago, Ill.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Thor Power Tool Co., Chicago, Ill.
Tinnerman Products, Inc., Cleveland, O.
Wittek Manufacturing Co., Chicago, Ill.

CLAMPS, PIPE REPAIR

Adams Pipe Repair Products, El Monte, Calif.
Atlas Industries, Inc., Houston, Tex.
Baker & Co., R. H., Los Angeles, Calif.
Burlis Products Co., Brooklyn, N. Y.
Chelsea Metal Stamping Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clow & Sons, Inc., James B., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Holub Industries, Inc., Sycamore, Ill.
Ideal Corp., Brooklyn, N. Y.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Ludlow Valve Mfg. Co., Inc., The, Troy, N. Y.
Marman Div., Aeroquip Corp., Los Angeles, Calif.
Morris Coupling & Clamp Co., Kittanning, Pa.
Pipe Line Development Co., Cleveland, O.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Skinner Co., M. B., South Bend, Ind.
Smith-Blair, Inc., South San Francisco, Calif.
Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

Adjustable Clamp Co., Chicago, Ill.
Atlas Welding Accessories Inc., Ferndale, Mich.
Billings & Spencer Co., Hartford, Conn.
Custanite Corp., Brooklyn, N. Y.
Detroit Stamping Co., Detroit, Mich.
Jewel Mfg. Co., St. Paul, Minn.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Lenco, Inc., Jackson, Mo.
Trindl Products, Ltd., Chicago, Ill.
Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

See Filters, Air, Electrostatic (with outside power source)

CLEANERS, PIPE LINE, ELECTRICALLY DRIVEN

Ken-Way Corp., Sparta, Wis.
Spartan Tool Co., Chicago, Ill.

CLEANERS, TUBE

Arcee Products, Pawtucket, R. I. (copper fitting cleaning tool)
Chesterton Co., A. W., Everett, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Hastings Air Control, Inc., Omaha, Nebr.
Mill-Rose Co., Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Osborn Mfg. Co., Cleveland, O.
Pierce Co., Wm. B., The, Buffalo, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Wilson, Inc., Thomas C., Long Island City, N. Y.

CLEANERS, VACUUM, FOR BOILERS

Ace Co., The, Ocala, Fla.
Black & Decker Mfg. Co., The, Towson, Md.
Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Empire Chemical Products Co., Newark, N. J.
Holub Industries, Inc., Sycamore, Ill.
Ideal Industries, Inc., Sycamore, Ill.
Kent Co., Inc., Rome, N. Y.
National Super Service Co., The, Toledo, O.
Premier Co., St. Paul, Minn.
Pullman Vacuum Cleaner Co., Boston, Mass.
Spencer Turbine Co., Hartford, Conn.

CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

CLEANING MACHINES, PIPE

See Machines, Pipe Cleaning; Cleaners, Pipe Line, Electrically Driven; Rams, Water, for Cleaning Out Pipe Lines

CLOSURES FOR PROTECTING PIPE AND TUBE FITTINGS

See Plugs, Caps and Closures for Protecting Pipe and Tube Fittings

CLOTH, TREATED, FOR DUST COLLECTORS

American Felt Co., Glenville, Conn.
Canvas Products Co., St. Louis, Mo.
Day Co., The, Minneapolis, Minn.
Menardi & Co., El Segundo, Calif.
Star Woolen Co., Cohoes, N. Y.

CLUTCHES, HYDRAULIC

See Drives, Fluid or Hydraulic, for Power Transmission

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Allied Porcenell, Inc., Chicago, Ill. (vitreous enamel coatings)
Amercoat Corporation, South Gate, Calif. (zinc, vinyl)
American Chemical Paint Co., Ambler, Pa. (rust proofing chemicals)
American Hard Rubber Co., Div of Amerace Corp., Butler, N. J. (rubber and plastic)
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
Armstrong Cork Co., Lancaster, Pa. **(asphalt for weather & low temperatures)**
Atlas Mineral Products Co., Mertztown, Pa. (plastic)
Automotive Rubber Co., Inc., Detroit, Mich. (rubber)
Barreled Sunlight Paint Co., Providence, R. I.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y. (Pitchbase and asphalt-base)
Bart Mfg. Corp., Belleville, N. J.
Blue Ridge Talc Co., Inc., Henry, Va.
Borden Co., The, Chemical Div., Coatings & Adhesives Div., Middlesex, N. J.
Brooklyn Paint & Varnish Co., Inc., Brooklyn, N. Y.
Cabot Inc., Samuel, Boston, Mass. (Bituminous black paint)
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carboline Co., The, St. Louis, Mo. (corrosion resisting)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asphalt and aluminum paints for roofs)
Chem Industrial Co., Brooklyn, O. (anti-rust paint)
Chemical Coatings & Engineering Co., Edgemont, Pa.
Chemical Solvent Co., Birmingham, Ala. (liquid)
Chicago Gasket Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J. (Metal spray)
Constad Laboratories, Jamaica, N. Y. (anti-rust paint)
Continental Products Co., Euclid, O. (paint)

Cordo Chemical Corp., Norwalk, Conn.
Corite Products, Inc., Chicago, Ill. (plastic)
Corrosion Control Co., Inc., New York, N. Y.
Corrosite Div., Reliance Paint Co., Brooklyn, N. Y. (vinyl plastic)
Corro-Vent, Inc., Cincinnati, O. (plastic)
Dampney Co. of America, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y.
Dennis Chemical Co., St. Louis, Mo.
Dow Corning Corp., Midland, Mich.
du Pont de Nemours & Co., E. I., Finishes Div., Wilmington, Del.
Eagle-Picher Co., Cincinnati, O.
Ellicott Fabricators, Inc., Baltimore, Md.
Elraco Engineering Co., Los Angeles, Calif. (interior tank paint)
Emjay Maintenance Engineers, Rutherford, N. J.
Ervite Corp., Erie, Pa. (porcelain enamel)
Flexrock Co., Philadelphia, Pa.
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Flood Co., Hudson, O. (paint additive)
Foster Co., Benjamin, Philadelphia, Pa.
France Refractories, Co., J. H., Snow Shoe, Pa. (cast iron & steel)
Garlock Packing Co., Palmyra, N. Y. (cementable teflon)
Gates Engineering Co., Wilmington, Del.
Gibson-Homans Co., Cleveland, O.
Glidden Co., The, Cleveland, O.
Goodall Rubber Co., Trenton, N. J. (liquid Neoprane)
Goodrich Industrial Products Co., B. F., Akron, O. (rubber)
Hague & Co., Inc., Alfred, Div. of Lacquer & Chemical Corp., Brooklyn, N. Y.
Harco Corp., Bedford, O. (corrosion protection for underground piping, process tanks, storage tanks, and radiant heating piping)
Heresite & Chemical Co., Manitowoc, Wis. (Synthetic rubber and phenolic coatings, baking type)
Hill, Hubbell & Co., Cleveland, O. (coating and wrapping for steel pipe)
Horn Co., Inc., A. C., Subsidiary of Sun Chemical Corp., Long Island, City, N. Y.
Houghton & Co., E. F., Philadelphia, Pa.
Industrial Metal Protectives, Inc., Dayton, O.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Insul-Mastic Corp. of America, Summit, Ill. (asphaltic & plastic)
Interchemical Corp., Finishes Div., Newark, N. J.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Kendall Co., Polyken Sales Div., Chicago, Ill. (tape, plastic)
Knapp Mills, Inc., Long Island City, N. Y. (lead ferralum)
Knight, Maurice A., Akron, O. (Vinyl plastic base)
Koppers Co., Inc., Pittsburgh, Pa. (coal tar)
Krylon, Inc., Norristown, Pa.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J. (rubber, PVC, neoprene)
Lithcote Corp., Melrose Park, Ill. (baked phenolic epoxy vinyl neoprene, plastisol and stone linings)
Maas & Waldstein Co., Newark, N. J.
Master Mechanics Co., Cleveland, O.
Metal & Thermit Corp., Rahway, N. J. (plastisol-vinyl phenolic)
Metalweld, Inc., Protective Coatings Div., Philadelphia, Pa. (linings for hot water tanks)
Midland Paint & Varnish Co., Cleveland, O.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich. (Sound dampening and insulating types as well as for protection against corrosion)
Miracle Adhesives Corp., Bellmore, N. Y. (anti-corrosive paint)
Moore & Co., Samuel, Mantau, O. (plastic)
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
National Lead Co., New York, N. Y. (Red lead)
National Pipe Coatings, Inc., Huntington Park, Calif.
Nebel Mfg. Co., Cleveland, O.
Neilsen Chemical Co., Detroit, Mich.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Niphos Process Sales Corp., New York, N. Y. (ferrous)
Oakite Products, Inc., New York, N. Y. (phosphate, chromate)
Octagon Process, Inc., Staten Island, N. Y. (rust preventive oils, rust-proofing compounds)
Ohmlac Paint & Refining Co., Inc., Long Island City, N. Y. (Acid resistant, heat resistant)
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa. (cement)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsalt Chemicals Corp., Philadelphia, Pa. **(chlorinated hydrocarbon base, and liquid neoprene base)**
Pittsburgh Coke & Chemical Co., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, lacquer)
Poe Co., C. W., The, Cleveland, O.
Polymer Corp., The, Reading, Pa. (plastic)
Porce-Lin Tank Lining Co., Detroit, Mich.
Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
Rhopac, Inc., Skokie, Ill. (pipe insulation)
Robertson Co., H. H., Pittsburgh, Pa. (bituminous)
Rotometals, San Francisco, Calif. (galvanizing repair stick)
Rubber & Plastics Compound Co., New York, N. Y. (anticorrosive coating)
Rust-Oleum Corp., Evanston, Ill.
Saran Lined Pipe Co., Ferndale, Mich.
Saverite Engineering Co., Hoboken, N. J. (Tank coatings, rust preventive)
Sealed Unit Parts Co., Inc., Bronx, N. Y. (liquid)
Sherwin-Williams Co., The, Cleveland, O.
Shutt Process Equipment Corp., St. Louis, Mo.
Solar Aircraft Co., San Diego, Calif. (ceramic)
Solfo Paint Mfg. Co., Trenton, N. J.
Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga. (Metallic paint)
Special Chemicals Corp., Ossining, N. Y. (Aluminum paint)
Speco, Inc., Cleveland, O.
Standard Oil Co. of California, San Francisco, Calif.
Steelcote Mfg. Co., St. Louis, Mo.
Surface Chemicals, Inc., McKees Rocks, Pa. (plastic)
Tapecoat Co., The, Evanston, Ill. (coal tar protective coating in tape form, for pipe, and pipe joints, pipe fittings, insulated pipe, both underground and above ground)
Thompson and Co., Oakmont, Pa.
Tropical Paint Co., Cleveland, O. (priming paint for iron & zinc)
Truscon Laboratories Div., Devoe & Raynolds Co., Inc., Detroit, Mich. (alkyd and epoxy resin)
Turco Products, Inc., Los Angeles, Calif.
United States Rubber Co., New York, N. Y. (rubber plastic, liquid plastic)
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
United States Stoneware Co., Plastics & Synthetics Div., Akron, O. (vinyls)
Vimasco Corp., Nitro, W. Va. (vinyl)
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Brighton, Mass.
Wilhelm Co., A., Reading, Pa.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

COCKS, BOILER GAGE

Bordo Co., Inc., L. J., Glenside, Pa.
Crane Co., Chicago, Ill.
Ernst Water Column & Gauge Co., Livingston, N. J.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Skokie, Ill.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Shank Co., Cyrus, Chicago, Ill.
Strahman Valves, Inc., New York, N. Y.
Swift Lubricator Co., The, **Elmira, N. Y.**
Williams Gauge Co., Inc., The, Pittsburgh, Pa.

COILS, CONDENSATION

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Buxton Mfg. Co., Dover, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Dunham-Bush, Inc., West Hartford, Conn.
General Ceramics Corp., Keasbey, N. J. (ceramic and plastic)
General Fittings Co., East Greenwich, R. I.
Heatron, Inc., York, Pa.
Lewis & Saunders, Lakeport, N. H.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Star Tubular Products Co., Chicago, Ill.
Trane Co., The, **La Crosse, Wis.**
Vilter Mfg. Co., The, Milwaukee, Wis.
Yula Water Heaters, Inc., Bronx, N. Y.

COILS, FINNED

See Surface, Finned, Cooling; Surface, Finned, Heating

COILS, FOR HOT WATER STORAGE TANKS

Adams Co., The, Dubuque, Ia.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alstrom Corp., New York, N. Y.
American Cooling Tower Co., Kansas City, Mo.
American Tube Products, Inc., West Warwick, R. I.
Bell & Gossett Co., Morton Grove, Ill.
Buxton Mfg. Co., Dover, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Dormont Mfg. Co., Pittsburgh, Pa.
Ellicott Fabricators, Inc., Baltimore, Md.
Federal Boiler Co., Inc., Midland Park, N. J.
General Fittings Co., East Greenwich, R. I.
Kewanee Boiler Div., American-Standard, Kewanee, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Lewis & Saunders, Lakeport, N. H.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Mar-Coil Heater Co., Union, N. J.
National Pipe Bending Co., New Haven, Conn.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pittsburgh, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Queen City Engineering Co., Charlotte, N. C.
Rempe Co., Chicago, Ill.
Republic Products Co., Philadelphia, Pa.
Richmond Engineering Co., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Sales & Co., Murray W., Detroit, Mich.
Sawhill Tubular Products, Inc., Sharon, Pa.
Sims Co., Erie, Pa.
Star Tubular Products Co., Chicago, Ill.
Taco Heaters, Inc., Cranston, R. I.
Tranter Mfg., Inc., Lansing, Mich.
Western Piping & Engineering Co., Inc., San Francisco, Calif.
Whitlock Mfg. Co., W. Hartford, Conn.
Yula Water Heaters, Inc., Bronx, N. Y.

COILS AND PANELS, RADIANT HEATING AND COOLING, PREFABRICATED

Also see Ceilings, Radiant Heating and Cooling, and Acoustical Control

American Brass Co., Waterbury, Conn.
Atlantic Pipe Bending and Fabricating Corp., Wood-Ridge, N. J.
Burgess-Manning Co., Architectural Products Div., Chicago, Ill. (also for radiant cooling)
Capitol Mfg. & Supply Co., Columbus, O.
Clow & Sons, Inc., James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.

Dole Refrigerating Co., Chicago, Ill.
Fricke, Fred J., Albuquerque, N. M.
Heat & Power Corp., Baltimore, Md.
Hi-Flow Products, Inc., Copiague, N. Y.
Knapp Mills, Inc., Long Island City, N. Y. (lead clad)
Kritzer Radiant Coils, Inc., Batavia, Ill.
Marlo Coil Co., St. Louis, Mo.
Nesbitt, Inc., John J., Philadelphia, Pa.
Olin Mathieson Chemical Corp., Western Brass Mills Div., East Alton, Ill. (roll bonded metal panels incorporating fluid passages)
Price Brothers, Dayton, O. (concrete slabs with openings for air travel or for hot water coils)
Radiant Heat and Cooling Co., Santa Clara, Calif.
Radiant Panel Mfg. Co., Torrington, Conn.
Reflectotherm, Inc., Cincinnati, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sawhill Tubular Products, Inc., Sharon, Pa.
Simplex Ceiling Corp., New York, N. Y.
Taylor Engineering Corp., Detroit, Mich.
Tranter Mfg. Inc., Lansing, Mich.
Wallace Supplies Mfg. Co., Chicago, Ill.

COILS, PIPE

Albert Pipe & Supply Co., Brooklyn, N. Y.
American Cooling Towers Co., Kansas City, Mo.
American Smelting & Refining Co., Federated Metals Div., New York, N. Y. (lead, lead covered and lead alloy)
Atlantic Pipe Bending and Fabricating Corp., Wood-Ridge, N. J.
Blaw Knox Co., Power Piping & Sprinkler Div., Pittsburgh, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Oak Park, Ill.
Clow & Sons, Inc., James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Crane Co., Chicago, Ill.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Division Lead Co., Summit, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill.
Heil Process Equipment Corp., Cleveland, O. (Impervious Graphite)
Howe Ice Machine Co., Chicago, Ill.
Imeco, Inc., Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead covered)
Lewis & Saunders, Lakeport, N. H.
Marlo Coil Co., St. Louis, Mo.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Niagara Blower Co., New York, N. Y.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Philadelphia Pipe Bending Co., Philadelphia.
Pittsburgh Pipe Coil & Bending Co., Etna, Pittsburgh, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sawhill Tubular Products, Inc., Sharon, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw-Kendall Engineering Co., Toledo, O.
Star Tubular Products Co., Chicago, Ill.
Taylor Engineering Corp., Detroit, Mich.
Tranter Mfg., Inc., Lansing, Mich.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Wallace Supplies Mfg. Co., Chicago, Ill.
Walworth Co., New York, N. Y.
Western Piping & Engineering Co., Inc., San Francisco, Calif.
Whitlock Mfg. Co., W. Hartford, Conn.

York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

COLLECTION, DUST AND FUME, ULTRASONIC

Advance Industries, Inc., Cambridge, Mass.

COLLECTORS, DUST

Aerotec Corp., The, Greenwich, Conn. (mechanical and electrical)
Aget Mfg. Co., Adrian, Mich.
Allington & Curtis Mfg. Co., Saginaw, Mich (centrifugal & bag)
American Air Filter Co., Inc., Louisville, Ky.
American Blow Pipe Co., Chicago, Ill. (shavings and sawdust, wet and dry type, buffing and polishing)
American Blower Corp., Detroit, Mich.
Baker Co., Inc., The, Biddeford, Me. (portable)
Banister Co., Inc., Cambridge, Mass. (centrifugal-dry and wet)
Blower Application Co., Milwaukee, Wis. (cyclone)
Bubar Dust Systems, Old Lyme, Conn. (mechanical)
Buell Engineering Co., Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y. (wet & dry)
Carolina Blower Co., Inc., Greensboro, N. C. (cyclone)
Centri-Spray Corp., Livonia, Mich. (Wet type)
Chicago Blower Corp., Franklin Park, Ill. (centrifugal)
Cincinnati Electrical Tool Co., The, Cincinnati, O. (self contained)
Clark Dust Control Co., Chicago, Ill.
Day Co., The, Minneapolis, Minn. (cyclones & filters)
DeVilbiss Co., The, Toledo, O.
Ducon Co., Inc., The, Mineola, N. Y. (Cyclone, centrifugal wash, and bag type)
Dust Filter Co., Chicago, Ill. (wet)
Dust Suppression & Engineering Co., Lake Orion, Mich.
Dustender Co., Ann Arbor, Mich.
Dustex Corp., Buffalo, N. Y. (mechanical)
Empire Chemical Products Co., Newark, N. J.
Farr Co., Los Angeles, Calif. (cyclonic)
Fluor Products Co., Whittier, Calif. (cyclone — wet & dry types)
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Goethel Sheet Metal Wks., Inc., Alfred, Milwaukee, Wis.
Green Fuel Economizer Co., Inc., The, Beacon, N. Y. (dry type)
Griffin & Co., Inc., Louisville, Ky. (cyclone)
Johnson March Corp., Philadelphia, Pa.
Joy Mfg. Co., Pittsburgh, Pa.
Kice Metal Products Co., Wichita, Kans.
Kirk & Blum Mfg. Co., Cincinnati, O.
Koppers Co., Inc., Pittsburgh, Pa. (mechanical)
Koppers Company, Inc., Metal Products Div., Baltimore, Md. (electrostatic)
Lumm Co., A. H., Toledo, O.
Mahon Co., R. C., The, Detroit, Mich. (dry inertia, air washers, fog filters)
National Dust Collector Corp., Chicago, Ill. (wet type)
Newcomb-Detroit Co., Detroit, Mich. (recirculating spray tube)
Northern Blower Co., Cleveland, O.
Omega Machine Co., Div. of B-I-F Industries, Inc., Providence, R. I. (bag type)
Pangborn Corp., Hagerstown, Md. (cloth filter and wet type)
Peabody Engineering Corp., New York, N. Y. (wet)
Peters-Dalton, Inc., Detroit, Mich.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Pulverizing Machinery Div., Metals Disintegrating Co., Inc., Summit, N. J. (filter bag)
Research-Cottrell, Inc., Bound Brook, N. J. (electrostatic & mechanical)
Ruemelin Mfg. Co., Milwaukee, Wis. (cloth bag type)
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Schmieg Industries, Inc., Detroit, Mich. (wet type)
Schneible Co., Claude B., Detroit, Mich. (wet type)
Shutt Process Equipment Co., St. Louis, Mo.
Sly Mfg. Co., W. W., Cleveland, O. (cloth bag type)
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldron & Co., Inc., Muncy, Pa.
Torit Mfg. Co., St. Paul, Minn. (cloth filter and centrifugal separator)
United Sheet Metal Co., Inc., Columbus, O. (cyclone)
Universal Gear Works, Inc., Detroit, Mich. (for portable industrial applications)
Vacu-Blast Co., Inc., Belmont, Calif. (wet type)
Wagner Awning & Mfg. Co., Cleveland, O. (Dust recovery bags)
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Wheelabrator Corp., Mishawaka, Ind. (cloth-tube type)
Winkler & Sons, Inc., A. E., Milwaukee, Wis. (cyclone)
Young & Bertke Co., Cincinnati, O. (cyclone type)
Zack Co., The, Chicago, Ill.

COLORIMETERS

American Instrument Co., Inc., Silver Spring, Md.
Bausch & Lomb Optical Co., Rochester, N. Y.
Ellison Draft Gage Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Manufacturers Engineering & Equipment Corp., Hatboro, Pa.
Will Corp., Rochester, N. Y.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion; Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMBUSTION TESTING KITS

See Kits, Combustion Testing; Analyzers, Carbon Dioxide, Portable; Indicators, Smoke; Testers, Smoke

COMPOUNDS, AIR FRESHENING

Aireactor Corp., New York, N. Y.
Airkem, Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.
Barnebey-Cheney Co., Columbus, O.
Easton R. S. Corp., Brooklyn, N. Y.
Lord & Clark Co., Inc., Boston, Mass.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.

COMPOUNDS, ANTI-FREEZE, FOR SNOW MELTING COILS

Commercial Solvents Corp., New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Socony-Mobil Oil Co., Inc., New York, N. Y.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.

COMPOUNDS, BOILER CLEANING

Agava Products, Inc., Jersey City, N. J.
Agnew & Tomlinson, Long Island City, N. Y.
American Chemical Paint Co., Ambler, Pa.
American K. A. T. Corp., Garwood, N. J.
American Sand-Banum Co., Inc., Freeport, N. Y.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Calgon Co., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Solvent Co., Birmingham, Ala.
Clayton Mfg. Co., El Monte, Calif.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Drew & Co., Inc., E. F., New York, N. Y.
duPont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington, Del.

Elraco Engineering Co., Los Angeles, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Houghton & Co., E. F., Philadelphia, Pa.
Kenite Laboratory, Madison, N. J.
Kewanee-Ross Corp., Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lindy Heaters, Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McMillan Industrial Supplies, C. C., Portland, Ore.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Moreheat Distribution, Inc., Cincinnati, O.
North American Mogul Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Octagon Process, Inc., Staten Island, N. Y.
Pennsalt Chemicals Corp., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Perolin Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Squires Co., C. E., The, Cleveland, O.
Strong, Carlisle & Hammond, Cleveland, O.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Ampion Corp., Long Island City, N. Y.
Arco Co., The, Cleveland, O.
Black & White Chemical Co., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Solvent Co., Birmingham, Ala.
Eagle-Picher Co., Cincinnati, O.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York.
Johns-Manville, New York, N. Y.
Kenite Laboratory, Madison, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Sulflo, Inc., Elizabeth, N. J.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CLEANING, AIR FILTER

Airkem, Inc., New York, N. Y.
Cuno Engineering Corp., Meriden, Conn.
Dollinger Corp., Rochester, N. Y.
Homestead Valve Mfg. Co. Coraopolis, Pa.
Madden Corp., Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Montgomery Chemical Co., Jenkintown, Pa.
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
Perolin Co., Inc., The, New York, N. Y.
Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
Trion, Inc., McKees Rocks, Pa.
Turco Products. Inc., Los Angeles, Calif.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

Agava Products, Inc., Jersey City, N. J.
Airkem, Inc., New York, N. Y.
American Chemical Paint Co., Ambler, Pa.
American Sand-Banum Co., Inc., Freeport, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Calgon Co., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Chemical Solvent Co., Birmingham, Ala.
Dearborn Chemical Co., Chicago, Ill.
Dowell, Inc., Tulsa, Okla.
Elraco Engineering Co., Los Angeles, Calif.
Garman Co., Inc., The, St. Louis, Mo. (also for pumps, condensers, etc.)
Hercules Chemicals Co., Inc., New York, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Krylon, Inc., Norristown, Pa.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
North American Mogul Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Octagon Process, Inc., Staten Island, N. Y.
Pennsalt Chemicals Corp., Philadelphia, Pa.
Perolin Co., Inc., New York, N. Y.
Petroleum Solvents Corp., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Stiles Karlsonite Corp., Waukegan, Ill.
Strong, Carlisle & Hammond, Cleveland, O.
Turco Products, Inc., Los Angeles, Calif.
Water Treatment Co. of America, Pittsburgh, Pa.

COMPOUNDS, LEAK DETECTING

See Isotopes, Radioactive, for Detecting Leaks in Piping and Heating Systems

COMPOUNDS, WELDING

Allen Co., Inc., L. B., Schiller Park, Ill.
Allied Weld-Craft, Inc., Indianapolis, Ind.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
American Solder & Flux Co., Philadelphia, Pa.
Atlas Welding Accessories Inc., Ferndale, Mich.
Eutectic Welding Alloys Corp., Flushing, N. Y.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Metal & Thermit Corp., Rahway, N. J.
Midland Paint & Varnish Co., Cleveland, O.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Solar Aircraft Co., San Diego, Calif.
Special Chemicals Corp., Ossining, N. Y.
Stainless Processing Div., Wall Colmonoy Corp., Detroit, Mich.
Thompson and Co., Oakmont, Pa.
Turco Products, Inc., Los Angeles, Calif.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Weldit, Inc., Detroit, Mich.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

COMPRESSED AIR DEHUMIDIFIERS

See Dehumidifiers for Compressed Air

COMPRESSED AIR MOTORS

See Motors, Compressed Air Powered

COMPRESSION PIPE FITTINGS

See Fittings, Pipe, Compression

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSOR PARTS

See Parts, Air Compressors; Parts, Refrigerating Compressors

COMPRESSOR SEALS

See Seals, Terminal, for Compressors

COMPRESSORS, AIR

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Beach-Russ Co., New York, N. Y.
Binks Mfg. Co., Chicago, Ill.
Brunner Div. of Dunham-Bush, Inc., Utica, N. Y.
Bury Compressor Co., Erie, Pa.
Carrier Corp., Syracuse, N. Y.
Champion Pneumatic Machinery Co., Princeton, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Clark Bros. Co., Div. of Dresser Operations, Inc., Olean, N. Y.
Cooper-Bessemer Corp., Mt. Vernon, O.
Curtis Mfg. Co., Refrigeration Div., St. Louis.
Davey Compressor Co., Kent, O.
Dayton Electric Mfg. Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Gray Co., Inc., Minneapolis, Minn.
Haskel Engineering & Supply Co., Glendale, Calif.
Ingersoll-Rand Co., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lima Electric Motor Co., Inc., The, Lima, O.
M & E Mfg. Co., Indianapolis, Ind.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Multiplex Mfg. Co., Berwick, Pa.
Nash Engineering Co., South Norwalk, Conn.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Powers Regulator Co., Skokie, Ill.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.
Schramm, Inc., West Chester, Pa.
Thomas Industries, Inc., Electric Sprayit Div., Sheboygan, Wis.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wayne Pump Co., Salisbury, Md.
Wilson Co., K. R., Arcade, N. Y.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

Airtemp Construction, Div. of Chrysler Corp., Dayton, O., (open and hermetic)
American Blower Corp., Detroit, Mich.
Carrier Corp., Syracuse, N. Y.
Trane Co., The, LaCrosse, Wis.
Worthington Corp., East Orange, N. J. (open & hermetic)
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

COMPRESSORS, REFRIGERATING, COMBINED WITH CONDENSER, WATER CHILLER, PIPING CONNECTIONS, AND CONTROLS

Acme Industries, Inc., Jackson, Mich.
Admiral Engineering Co., Inc., Chicago, Ill.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Brown Products Corp., Union, N. J.
Brunner Div. of Dunham-Bush, Inc., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Coleman Co., Inc., The, Wichita, Kans.
Cool-Ette, Inc., Detroit, Mich.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
Frick Co., Waynesboro, Pa.
Heat-X, Inc., Brewster, N. Y.
Lehigh Mfg. Co., Div. of Lehigh Inc., Lancaster, Pa.
Mayer Refrigerating Eng., Inc., Lincoln Park, N. J.
National-U. S. Radiator Corp., Johnstown, Pa.
Primor Products, Div. Borg-Warner Corp., Adrian, Mich.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.

Schnacke, Inc., Evansville, Ind.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., The, Milwaukee, Wis.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

COMPRESSORS, REFRIGERATING, RECIPROCATING

Airtemp Construction, Div. of Chrysler Corp., Dayton, O. (open)
Bendix-Westinghouse Automotive Air Brake Co., Evansville, Ind. (hermetic & semi-hermetic)
Brunner Co., Subsidiary of Dunham-Bush, Inc., Gainesville, Ga. (semi-hermetic)
Brunner Div. of Dunham-Bush, Inc., Utica, N. Y. ("Freon" 12 & 22) (open & hermetic)
Carrier Corp., Syracuse, N. Y. (open & hermetic)
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial) (open)
Cooper-Bessemer Corp., The, Mt. Vernon, O. (open)
Copeland Refrigeration Corp., Sidney, O. (open & hermetic)
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo. (open)
Dersch, Gesswein & Neuert, Inc., Chicago, Ill. (open)
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa. (open & hermetic)
Frick Co., Waynesboro, Pa. (Ammonia, "Freon") (open)
Frigidaire Div., General Motors Corp., Dayton, O. (Semi-hermetic and hermetic)
Howe Ice Machine Co., Chicago, Ill. (open)
Ingersoll-Rand Co., New York, N. Y. (open)
Kelvinator Div., American Motors Corp., Detroit, Mich. (hermetic)
Lehigh Mfg. Co., Div. of Lehigh Inc., Lancaster, Pa. (open & hermetic)
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis. (open)
Multiplex Mfg. Co., Berwick, Pa. (open)
Onan & Sons Inc., D. W., Minneapolis, Minn. (engine-driven)
Ready-Power Co., The, Detroit, Mich. (refrigeration unit driven by direct-connected internal combustion engine) (hermetic)
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia) (open)
Schnacke, Inc., Evansville, Ind. (hermetic)
Stewart Ice Machine Co., Pomona, Calif. (open)
Tecumseh Products Co., Tecumseh, Mich. (open and hermetic)
Thermo King Corp., Minneapolis, Minn. (open)
Trane Co., The, LaCrosse, Wis. (hermetic)
Vilter Mfg. Co., Milwaukee, Wis. ("Freon" ammonia) (open)
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va. (hermetic)
Worthington Corp., East Orange, N. J. (open and hermetic)
York Corp., Subsidiary of Borg-Warner Corp., York, Pa. (Ammonia, freon) (open and hermetic)

COMPRESSORS, REFRIGERATING, STEAM JET

Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.

COMPRESSORS, STEAM BOOSTER

Bury Compressor Co., Erie, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Worthington Corp., East Orange, N. J.

CONCRETE, INSULATING, FOR UNDERGROUND PIPING

Dockstader, Inc., S. E., Washington, D. C.
Mearlcrete Div., Mearl Mfg. Corp., Roselle Park, N. J.
Munn and Steele, Inc., South Boston, Mass.
Poe Co., C. W., The, Cleveland, O.
Zonolite Co., Chicago, Ill.

CONDENSATE DISPOSAL UNITS

See Pumps, Condensate, For Removing Condensation From Air Conditioning Units

CONDENSATE RETURN

See Pumps, Condensation Return; Systems, Condensate Return

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSER TUBES

See Tubes, Condenser

CONDENSERS, REFRIGERATING, AIR COOLED

American Coils Co., Farmingdale, N. J. (2, 3, 5, 7½ tons)
American Furnace Co., St. Louis, Mo. (to 5 tons)
American Standard, Air Conditioning Div., New York, N. Y. (2, 3 & 5 ton size)
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O. (2, 3 & 5 ton)
Baker Mfg. Co., Wichita Falls, Tex.
Blazer & Son, M., Passaic, N. J. (to 200 tons)
Bohn Aluminum & Brass Corp., Detroit, Mich. (2, 3, 5, & 7 ton)
Bohn Aluminum & Brass Corp., Betz Div., Danville, Ill. (2-15 tons)
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Cobell Industries, Ft. Worth, Tex. (3 to 5 ton)
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Day & Night Mfg. Co., Monrovia, Calif. (3, 4, 5, 7½ tons)
Deansteel Products Co., San Antonio, Tex. (3, 5, 7½ ton)
Domestic Mfg. Corp., Houston, Tex.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J. (2 to 10 tons)
F 5 Air Conditioning Corp., Tulsa, Okla. (2-30 tons)
Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O. (2, 3, & 5 ton)
Frigid Coil, Inc., El Monte, Calif.
General Air Conditioning Corp., Los Angeles, Calif. (2, 3 ton)
Halstead & Mitchell, Pittsburgh, Pa. (5 to 50 tons)
Heat-Exchangers, Inc., Chicago, Ill. (up to 10 ton)
Henry Furnace Co., The, Medina, O. (2, 3, 5 ton)
Kirsch Co., Refrigeration Div., Sturgis, Mich.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga. (2-20 tons)
Lennox Industries, Inc., Marshalltown, Ia. (2, 3, 5, 7½ and 10 ton)
Magic Aire Div., United Electric Co., Wichita Falls, Tex. (2, 3, 5, & 7½ tons)
Marlo Coil Co., St. Louis, Mo. (1 to 20 tons)
McCord Corp., Detroit, Mich. (to 3 HP)
McQuay, Inc., Minneapolis, Minn. (2 to 15 HP)
Peerless of America, Inc., Chicago, Ill.
Perfection Industries Div., Hupp Corp., Cleveland, O. (2, 3, 5 ton)
Recold Corp., Los Angeles, Calif. (5 thru 20 tons)
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill. (1-30 tons)
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y. (up to 7½ hp)
Roberts-Gordon Appliance Corp., Buffalo, N. Y. (1¾-2-3-5 ton)
Rome-Turney Radiator Co., Rome, N. Y.
Round Oak Co., Inc., Dowagiac, Mich. (1½-5 HP)
Superior Radiator Corp., Minneapolis, Minn. (½ thru 30 HP)
Temtrol, Inc., Okarche, Okla.
Tenney Engineering, Inc., Union, N. J.
Tubenfin Coil Co., Houston, Tex. (up to 20 tons)
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Uniter States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., The, Milwaukee, Wis.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Whirlpool Corp., St. Joseph, Mich.
Witt Co., A. H., Los Angeles, Calif. (2-40 ton)
Worthington Corp., East Orange, N. J.

CONDENSERS, REFRIGERATING, EVAPORATIVE

Acme Industries, Inc., Jackson, Mich.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
American Blower Corp., Detroit, Mich.
American Coils Co., Farmingdale, N. J.
American Cooling Tower Co., Kansas City, Mo.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Blazer & Son, M., Passaic, N. J. (to 200 tons)
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y. ("Freon," ammonia)
Chrysler Airtemp, Div. of Chrylser Corp., Dayton, O. (5 to 30 tons)
Cobell Industries, Ft. Worth, Tex.
Curtis Mfg. Co., Refrigeration Div., St. Louis.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Governair Corp., Oklahoma City, Okla.
Kennard Corp., St. Louis, Mo.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
National-U. S. Radiator Corp., Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Perfection Industries Div., Hupp Corp., Cleveland, O. (2, 3, 4, 5, 6 ton)
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Wall Tube and Metal Products Co., Newport, Tenn.
Watkins Co., J. E., Maywood, Ill.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Worthington Corp., East Orange, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Yorktowne Machine Co., York, Pa.

CONDENSERS, REFRIGERATING, SHELL AND COIL

Acme Industries, Inc., Jackson, Mich.
Bell & Gossett Co., Morton Grove, Ill.
Carrier Corp., Syracuse, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Dunham-Bush, Inc., West Hartford, Conn.

Edwards Engineering Corp., Pompton Plains, N. J.
Filtrine Mfg. Co., Inc., Waldwick, N. J.
General Fittings Co., East Greenwich, R. I.
Halstead & Mitchell, Pittsburgh, Pa. (Double tube)
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Heil Process Equipment Corp., Cleveland, O.
Howe Ice Machine Co., Chicago, Ill. (Freon ammonia methyl chloride)
Lehigh Mfg. Co., Div. of Lehigh Inc., Lancaster, Pa.
National-U. S. Radiator Corp., Johnstown, Pa.
Nooter Corp., St. Louis, Mo.
Reco Products Div., Recony Corp., New York, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Whitlock M[illegible] W. Hartford, Conn.
Worthing[illegible])range, N. J.
X L R[illegible] ,hicago, Ill.
York [illegible] liary of Borg-Warner Corp.,
Young Ra[illegible] Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

Acme Industries, Inc., Jackson, Mich.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Armstrong Co., Richard M., West Chester, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Buxton Mfg. Co., Dover, N. J.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooley Co., E. C., San Francisco, Calif.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Dunham-Bush, Inc., West Hartford, Conn.
Frick Co., Waynesboro, Pa.
Heat-X, Inc., Brewster, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Manning & Lewis Engineering Co., Newark, N. J.
National-U. S. Radiator Corp., Johnstown, Pa.
Nooter Corp., St. Louis, Mo.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Ready-Power Co., The, Detroit, Mich.
Reco Products Div., Recony Corp., New York.
Reliance Refrigerating Machine Co., Chicago, Ill.
Schnacke, Inc., Evansville, Ind.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Standard Refrigeration Co., Chicago, Ill.
Stewart Ice Machine Co., Pomona, Calif.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Whitlock Mfg. Co., W. Hartford, Conn.
Worthington Corp., East Orange, N. J.
X L Refrigerating Co., Chicago, Ill.

York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., Bronx, N. Y.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUCTORS AND PANELS, ELECTRICAL, FOR RADIANT HEATING

Adam Electric Co., Frank, St. Louis, Mo.
Berko Electric Mfg. Co., Queens Village, N. Y.
Can Arm Corp., Champlain, N. Y.
Cavalier Corp., Electric Heating Div., Chattanooga, Tenn.
Continental Radiant Glass Heating Corp., New York, N. Y.
Corning Glass Works, Corning, N. Y.
Crystalheat Co., Van Nuys, Calif.
Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Electrend Products Corp., St. Joseph, Mich.
Electriglas Corp., Bergenfield, N. J. (electric glass panels)
Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
Electrovector, Inc., Brooklyn, N. Y.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Heatmore, Inc., Brooklyn, N. Y.
LaSalle Products, Inc., Buffalo, N. Y.
Markel Electric Products, Inc., Buffalo, N. Y.
Matthews Electric Heater Mfg. Co., Albertville, Ala.
Modernheat Cable Corp., Kingsport, Tenn.
NuTone, Inc., Cincinnati, O.
Pyrne & Co., Inc., Pomona, Calif.
Roberson Inc., Seattle, Wash.
Salton Mfg. Co., Inc., New York, N. Y.
Sunwarm, Inc., Kingsport, Tenn.
ThermoRay Corp., Newark, N. J.
United States Rubber Co., New York, N. Y.
Westinghouse Electric Corp., Electric Heater Div., Emeryville, Calif.
Wiegand Co., Edwin L., Pittsburgh, Pa.

CONDUIT, UNDERGROUND PIPING

Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Dockstader, Inc., S. E., Washington, D. C.
Durant Insulated Pipe Co., E. Palo Alto, Calif.
Durant Insulated Pipe Co., Inc., Williamstown, N. J.
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O. (PVC)
Heat Transmission Conduit Co., Cleveland, O.
Johns-Manville, New York, N. Y.
Kaiser Co., E. B., Glenview, Ill.
Mearlcrete Div., Mearl Mfg. Corp., Roselle Park, N. J.
Porter & Co., Inc., H. W., Newark, N. J.
Ric-wiL, Inc., Barberton, O.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Stillwater Clay Products Co., The, Cleveland, O.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

American Metal Hose Div., American Brass Co., Waterbury, Conn.
Cain Mfg. Co., Birmingham, Ala.
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Elgen Mfg. Corp., Long Island City, N. Y.
Flexaust Co., New York, N. Y.
Flexible Tubing Corp., Guilford, Conn.
Flexonics Corp., Maywood, Ill.
Grant Wilson, Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Nicolet Industries, Inc., Hamilton, O.
St. Clair Rubber Co., Detroit, Mich.
Titeflex, Inc., East Springfield, Mass.
United States Rubber Co., New York, N. Y.
Ventfabrics Inc., Chicago, Ill.
Wagner Awning & Mfg. Co., Cleveland, O.
Wiremold Co., Hartford, Conn.

CONNECTORS, FILLING, HYDROSTATIC TEST

Airaterra (Roylyn Products), Glendale, Calif.
Cobra Metal Hose Div., Chicago, Ill.
Gasoilair Equipment, New Haven, Conn.
Mechanical Products Corp., Chicago, Ill.
Scully Signal Co., Melrose, Mass.

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

Acme Steel Co., Chicago, Ill. (Strapping)
Cain Mfg. Co., Birmingham, Ala.
Lumm Co., A. H., Toledo, O.
United States Rubber Co., New York, N. Y.

CONTINUOUS HEATERS

See Heaters, Steam Jet, for Liquids

CONTROL SYSTEMS, PRE-ASSEMBLED AS UNITS, FOR HEATING, COOLING AND VENTILATING

Factory Assemblies Using Other Manufacturers' Valves, Thermostats, Damper Motors, etc.

American Moistening Co., Providence, R. I.
Arens Controls, The, Evanston, Ill.
Automatic Devices Co., Inc., Western Springs, Ill.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Burke Engineering, Los Angeles, Calif.
Carvell Heat Equipment Co., Los Angeles, Calif.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Cleveland Controls, Inc., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
Devco Engineering, Inc., Caldwell, N. J.
Dunham-Bush, Inc., West Hartford, Conn.
Fischer & Porter Co., Hatboro, Pa.
Heat-Timer Corp., New York, N. Y.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
International Business Machines Corp., New York, N. Y.
Master Control Co., The, Cuyahoga Falls, O.
Midwest Air Conditioning Co., Des Moines, Ia.
Midwest Automatic Control Co., Des Moines, Ia.
Ray Oil Burner Co., San Francisco, Calif.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Watkins Co., J. E., Maywood, Ill.
Webster & Co., Warren, Camden, N. J.
West Instrument Corp., Chicago, Ill.

CONTROLLERS AND STARTERS, MOTOR

ACEC Electric Corp., New York, N. Y.
Airgard Mfg. Co., Chicago, Ill.
Allen-Bradley Co., Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Burke Engineering, Los Angeles, Calif.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
Ebert Electronics Corp., Queens Village, N. Y.
Electric Controller & Mfg. Co., Div. of Square D Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Franklin Dales Co., Akron, O.
Furnas Electric Co., Batavia, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Electric Co., Appliance Control Dept., Morrison, Ill.
Guardian Electric Mfg. Co., Chicago, Ill.
Ideal Electric & Mfg. Co., Mansfield, O.
International Business Machine Corp., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller, Rockland, Mass.
Nelson Electric Mfg. Co., Tulsa, Okla.
Potter & Brumfield Sales Co., Inc., Princeton, Ind.
Reynolds Electric Co., River Grove, Ill.

Square D Co., Industrial Controller Div., Milwaukee, Wis.
Teleflex Inc., North Wales, Pa.
United Electric Controls Co., Watertown, Mass.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

Barber-Colman Co., Rockford, Ill.
De-Tec-Tronic Corp., Chicago, Ill.
Stanley Works, The, New Britain, Conn.
Sterns-Flinn Corp., New York, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Worner Electronic Devices, Rankin, Ill.

CONTROLS, DRAFT, BAROMETRIC

Ace Instrument Co., Inc., Brooklyn, N. Y.
Boston Machine Works Co., Lynn, Mass.
Bristol Co., The, Waterbury, Conn.
Cole-Sewell Engineering Co., St. Paul, Minn.
Combustion Equipment Co., Moline, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fuel Reduction Corp., Chicago, Ill.
Fuelguard Co., Dallas, Tex.
General Controls Co., Glendale, Calif.
Hotstream Heater Co., Cleveland, O.
Krueger Sentry Gauge Co., Green Bay, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Salina Metal Products Co., Salina, Kan.
Simplex Mfg. Co., Fond du Lac, Wis.
Steinen Mfg. Co., Wm., Newark, N. J.
Walker Mfg. & Sales Co., St. Joseph, Mo.
Windmaster Div., Lima Register Co., Lima, O.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

Allen Mfg. Co., W. D., Chicago, Ill.
American District Telegraph Co., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Clark Controller Co., Cleveland, O.
Fenwal Inc., Ashland, Mass.
Grinnell Co., Inc., Providence, R. I.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Sperti Faraday, Inc., Adrian, Mich.
Synchro-Start Products, Inc., Skokie, Ill.

CONTROLS, FLAME FAILURE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
American District Telegraph Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Baso, Inc., Milwaukee, Wis.
Bressler Engineering Service, Oregon, Ill.
Bristol Co., The, Waterbury, Conn.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Defender Instrument & Regulator Co., Boody, Ill.
De-Tec-Tronic Corp., Chicago, Ill.
Drying Systems Co., Chicago, Ill.
Ess Instrument Co., Bergenfield, N. J.
Fuelguard Co., Dallas, Tex.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Haney Gas Burner & Engrs., Inc., Monrovia, Calif.
Mercoid Corp., The, Chicago, Ill.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Controls, Inc., Goshen, Ind.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Scully Signal Co., Melrose, Mass.
Stout & Sons, David, St. Louis, Mo.
Teleflex Inc., North Wales, Pa.
Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
White-Rodgers Co., St. Louis, Mo.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Systems, Combusion Control; Systems, Heating; Thermostats; Valves, Balancing, for Forced Hot Water Heating Systems; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valve; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

CONVECTORS

See Radiation, Convection Type

CONVERTORS, STEAM

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alstrom Corp., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Beltran Associates, Inc., Brooklyn, N. Y.
Buxton Mfg. Co., Dover, N. J.
Cooley Co., E. C., San Francisco, Calif.
Davis Engineering Corp., Elizabeth, N. J.
Dunham-Bush, Inc., West Hartford, Conn.
Ellicott Fabricators, Inc., Baltimore, Md.
General Fittings Co., East Greenwich, R. I.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Richmond Engineering Co., Richmond, Va.
Taco Heaters, Inc., Cranston, R. I.
Yula Water Heaters, Inc., Bronx, N. Y.

CONVEYORS, COAL AND ASH

Ajax Flexible Coupling Co., Westfield, N. Y.
American Coal Burner and Wood Stoker Corp., Chicago, Ill.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I. (continuous weighing)
Canton Stoker Corp., Canton, O.
Chain Belt Co., Milwaukee, Wis.
Cleveland Crane & Eng. Co., Wickliffe, O.
Dayton Automatic Stoker Co., Dayton, O.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Electric Furnace-Man, Inc., Emmaus, Pa.
Fluor Products Co., Whittier, Calif.
Hager Bros., Rockford, Ill.
Hewitt-Robins, Inc., Stamford, Conn.
Jeffrey Mfg. Co., Columbus, O.
Johnston & Jennings Co., Cleveland, O.
Joy Mfg. Co., Pittsburgh, Pa.
Kol-Master Corp., Oregon, Ill.
Link-Belt Co., Chicago, Ill.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Spurgeon Co., Warren, Mich.
Whitty Co., Inc., Boston, Mass.

COOLERS, CRANE CAB

Dravo Corp., Machinery Div., Pittsburgh, Pa.
Lintern Corp., Painesville, O.
Trane Co., The, LaCrosse, Wis.

COOLERS, EVAPORATIVE

See Units, Air Conditioning, Summer, Evaporative Cooling Type

COOLERS, OIL

Acme Industries, Inc., Jackson, Mich.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alco Products, Inc., Schenectady, N. Y.
American Cooling Tower Co., Kansas City, Mo.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., West Chester, Pa.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Bell & Gossett Co., Morton Grove, Ill.
Buxton Mfg. Co., Dover, N. J.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooley Co., E. C., San Francisco, Calif.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Ellis & Watts Products, Inc., Cincinnati, O. (solvent)
Fedders-Quigan Corp., Buffalo, N. Y.
Fluor Products Co., Whittier, Calif.
G & O Mfg. Co., New Haven, Conn.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Griffin & Co., Louisville, Ky.
Griscom-Russell Co., The, Massillon, O.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Kellogg Co., The, M. W., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Warren, Pa.
Super Radiator Corp., Minneapolis, Minn.
Taco Heaters, Inc., Cranston, R. I.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
Tranter Mfg., Inc., Lansing, Mich.
Vogt Machine Co., Henry, Louisville, Ky.
Whitlock Mfg. Co., W. Hartford, Conn.
Witt Co., A. H., Los Angeles, Calif.
Yates-American Machine Co., Heat Transfer Products Div., Beloit, Wis.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., Bronx, N. Y.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

Auburn Burner Co., Auburn, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Dole Refrigerating Co., Chicago, Ill.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Filtrine Mfg. Co., Inc., Waldwick, N. J.
Frick Co., Waynesboro, Pa.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Imeco, Inc., Chicago, Ill.
King Co. of Owatonna, The, Owatonna, Minn.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.

Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York, N. Y.
Reco Products Div., Recony Corp., New York, N. Y.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

American Cooling Tower Co., Kansas City, Mo.
Bohn Aluminum & Brass Corp., Betz Div., Danville, Ill.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Dole Refrigerating Co., Chicago, Ill.
Drayer-Hanson Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Frigid Coil, Inc., El Monte, Calif.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Imeco, Inc., Chicago, Ill.
King Co. of Owatonna, The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
Master-Bilt Refrigeration Mfg. Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Reco Products Div., Recony Corp., New York, N. Y.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Tenney Engineering, Inc., Union, N. J.
Vilter Mfg. Co., Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.
Wilson Engineering Corp., Chicago, Ill.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

COOLING COILS

See Surface Finned Cooling

COOLING SURFACE

See Surface Finned Cooling

COOLING TOWERS

See Towers, Cooling

COOLING UNITS

See Units, Air Conditioning; Coolers, Unit

COPPER PIPE

See Pipe, Brass and Copper

COPPER SHEETS

See Sheets, Copper

COPPER TUBE FITTINGS

See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED

See Fittings, Copper Tube, Flared

COPPER TUBING

See Tubing, Brass and Copper

CORROSION PREVENTIVES

See Devices, Electrolytic, for Preventing Corrosion; Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST

Bausch & Lomb Optical Co., Rochester, N. Y.
Hill & Co., E. Vernon., Lake Geneva, Wis.
Mine Safety Appliances Co., Pittsburgh, Pa.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
American Flexible Coupling Div., Zurn Industries, Inc., Erie, Pa.
Blood Brothers Machine Div., Rockwell Spring and Axle Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Quincy, Mass.
Brooks Equipment Corp., Hoboken, N. J.
Browning Mfg. Co., Maysville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clark Flexible Link Shaft Co., Newton Highlands, Mass.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Climax Metal Products Co., Cleveland, O.
Congress Drives Div., Tann Corp., Detroit, Mich.
De Laval Steam Turbine Co., Trenton, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Elliott Co., Jeannette, Pa.
Falk Corp., Milwaukee, Wis.
Guardian Products Corp., Michigan City, Ind.
Hewitt-Robins, Inc., Stamford, Conn.
Jeffrey Mfg. Co., Columbus, O.
Jones Machinery Div., Hewitt-Robins, Inc., Chicago, Ill.
Koppers Company, Inc., Metal Products Div., Baltimore, Md.
Link Belt Co., Chicago, Ill.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton, O. (automatic centrifugal clutch)
Morse Chain Co., Ithaca, N. Y.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Piezo Mfg. Corp., Staten Island, N. Y.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Thomas Flexible Coupling, Warren, Pa.
Waldron Corp., John, New Brunswick, N. J. (gear type)
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitney Chain Co., Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

COUPLINGS, PIPE

Acheson Mfg. Co., Rankin, Pa.
Aeroquip Corp., Jackson, Mich.
Aeroquip Corp., Western Div., Burbank, Calif.
Aeroquip, Inc., Van Wert, O.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
Alloy Steel Products Co., Linden, N. J. (stainless)
Anderson Brass Co., Detroit, Mich.
Baker & Co., R. H., Los Angeles, Calif.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Camco Products Inc., North Haven, Conn. (stainless)
Capitol Mfg. & Supply Co., Columbus, O.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, Inc., James B., Chicago, Ill.
Continental-Diamond Fibre Corp., Newark, Del.
Cooper-Alloy Corp., Hillside, N. J. (stainless)
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Electric Steel Foundry Co., Portland, Ore.
Fischer & Porter Co., Hatboro, Pa. (glass to glass; glass to metal)
Flagg & Co., Inc., Stanley G., Philadelphia.
Flodar Corp., Cleveland, O.
Frick Co., Waynesboro, Pa.
Frontier Bronze Corp., Niagara Falls, N. Y.
Gilbert Brass Foundry Co., St. Louis, Mo.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O. (PVC)
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Hansen Mfg. Co., Cleveland, O.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Hartwell & Son, H. N., Boston, Mass. (plastic)
Henry Valve Co., Melrose Park, Ill.
Illinois Malleable Iron Co., Chicago, Ill.
Johns-Manville, New York, N. Y. (asbestos - cement)
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
King Union Co., Inc., Hillsgrove, R. I.
Ladish Co., Cudahy, Wis.
Malleable Iron Fittings Co., Branford, Conn.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Morris Coupling & Clamp Co., Kittanning, Pa.
Mueller Brass Co., Port Huron, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
New York Brass Foundry, New York, N. Y. (brass)
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pipe Line Development Co., Cleveland, O.
Pipe Plugs, Inc., Wellington, O.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Pipe & Coupling Co., Allison Park, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J. (forged steel & stainless steel)
Rhode Island Fittings Co., Providence, R. I. (malleable)
Span Brass Mfg. Co., Otsego, Mich.
Spang-Chalfant, Div. of the National Supply Co., Pittsburgh, Pa.
Star Stainless Screw Co., Paterson, N. J.
Steel Improvement & Forge Co., The, Cleveland, O.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Div. of The Electric Storage Battery Co., Trenton, N. J. (unplasticized polyvinyl chloride)
Swepco Tube Corp., Clifton, N. J.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky. (welding couplings)
Tube Turns Plastics, Inc., Louisville, Ky. (PVC)
U. S. Plug & Fitting Co., Wellington, O.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Works Co., Inc., Chelsea, Mass.
United States Stoneware Co., New York, N. Y.
Vanton Pump & Equipment Corp., Hillside, N. J.
Victaulic Co. of America, Elizabeth, N. J.
Vogt Machine Co., Henry, Louisville, Ky.
Wachs Co., E. H., The, Chicago, Ill.
Walworth Co., New York, N. Y. (steel, plastic and stainless)
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Wheatland Tube Co., Philadelphia, Pa. (steel)
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Aeroquip Corp., Western Div., Burbank, Calif.
Aeroquip, Inc., Van Wert, O.
Airaterra (Roylyn Products), Glendale, Calif.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Alloy Stainless Products Co., Totowa, N. J.
American Flow Control Corp., Houston, Tex.
Anchor Coupling Co., Libertyville, Ill. (hose)
Baker & Co., R. H., Los Angeles, Calif.
Goodrich Industrial Products Co., B. F.,

Plastic Products, Marietta, O. (PVC)
Hunt & Son, Inc., C. B., Salem, O.
Johnson Metal Hose, Inc., Waterbury, Conn.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Morris Coupling & Clamp Co., Kittanning, Pa.
Nelson Foundry Co., Morton Grove, Ill.
OPW Corp., Cincinnati, O.
Quick Joint Div., Automatic Bending Co., Harvey, Ill.
Smith Bros. Co., Oak Park, Ill.
Snap-Tite, Inc., Union City, Pa.
Swepco Tube Corp., Clifton, N. J.
Vanton Pump & Equipment Corp., Hillside, N. J.
Victaulic Co. of America, Elizabeth, N. J.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Zalo Mfg. Co., Cleveland, O.

COVERS, PROTECTIVE, FOR WINDOW AIR CONDITIONERS

Blossom Mfg. Co., Inc., New York, N. Y.
Budlew Products Co., Chicago, Ill.
Canvas Products Co., St. Louis, Mo.
Ero Mfg. Co., Chicago, Ill.
International Covers for Air Conditioners Corp., New York, N. Y.
Tulsa Canvas Products Co., Inc., Tulsa, Okla.
Wagner Awning & Mfg. Co., Cleveland, O.

CRANE CAB COOLERS

See Coolers, Crane Cab

CUT-OFFS, LOW WATER, HEATING BOILER

Eclipse Fuel Engineering Co., Rockford, Ill.
Econo Products Company, Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Instruments, Inc., Tulsa, Okla.
Johnson Corp., The, Three Rivers, Mich.
Magnetrol Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Morse-Smith-Morse Co., The, Watertown, Mass.
Newark Controls Co., Bloomfield, N. J.
Reliance Gauge Column Co., Cleveland, O.
Schaub Engineering Co., Fred H., Chicago.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

CUTTERS, FLAME FOR PIPING

Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Steffan Engineering, Salem, O.
Vernon Tool Co., Ltd., Alhambra, Calif.

CUTTERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Baker & Co., R. H., Los Angeles, Calif.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O. (knife and wheel)
Capewell Mfg. Co., Hartford, Conn.
Clow & Sons, Inc., James B., Chicago, Ill.
Collins Machinery Corp., Los Angeles, Calif.
Continental Machine Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
Kalamazoo Tank & Silo Co., Machine Tool Div., Kalamazoo, Mich. (metal cutting band saw)
Landis Machine Co., Inc., Waynesboro, Pa. (roller)
M-M-A, Inc., Lancaster, Pa.
Nye Tool Co., Chicago, Ill.
Obear & Son, W. F., Inglewood, Calif. (abrasive)
Oster Mfg. Co., Cleveland, O. (portable power)
Pilot Mfg. Co., Torrance, Calif. (asbestos-cement)
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Saunders Mfg. Co., Yonkers, N. Y.
Springload Mfg. Corp., Seattle, Wash. (cast iron, clay, asbestos, cement)
Steffan Engineering, Salem, O.
Talon Tools, Inc., North Arlington, N. J. (chain type)
Toledo Pipe Threading Machine Co., Toledo, O. (wheel)
Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass. (hand)
Wachs Co., E. H., The, Chicago, Ill. (portable electric and air drive)

CUTTERS, TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Collins Machinery Corp., Los Angeles, Calif.
Continental Machine Co., Chicago, Ill.
Couplings Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Fenway Machine Co., Philadelphia, Pa. (also sheet metal)
Fine Products Co., Berwyn, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa. (roller)
Mueller Brass Co., Port Huron, Mich.
Nye Tool Co., Chicago, Ill.
Obear & Son, W. F., Inglewood, Calif.
Penn Brass & Copper Co., Erie, Pa.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Springload Mfg. Corp., Seattle, Wash.
Talon Tools, Inc., North Arlington, N. J.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass. (hand)
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Wallace Supplies Mfg. Co., Chicago, Ill.
Weatherhead Co., Ft. Wayne Div., Ft. Wayne, Ind.
Wilson Manufacturing Co., Memphis, Tenn.

DAMPERS, AIR, BACK-DRAFT

Ammerman Co., Inc., Minneapolis, Minn.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Jenn-Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Thermotank, Inc., Products Div., Detroit, Mich.
United States Register Co., Battle Creek, Mich.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DIFFUSER

Air Devices, Inc., New York, N. Y.
Air-Factors, Inc., Monrovia, Calif.
Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Gallaher Co., The, Omaha, Neb.
Hart & Cooley Mfg. Co., Holland, Mich.
Lima Register Co., Lima, O.
Round Oak Co., Inc., Dowagiac, Mich.
Smith Co., J. B., Philadelphia, Pa.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, MANUALLY OPERATED

Adams Co., The, Dubuque, Ia.
Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovia, Calif.
Air-Path Products Co., Baltimore, Md.
Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo.
Ammerman Co., Inc., Minneapolis, Minn.
Anemostat Corp. of America, New York.
Champion Furnace Pipe Co., Peoria, Ill.
Controlair Mfg. Co., Los Angeles, Calif.
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
General Register Corp., Cedar Grove, N. J.
Hart & Cooley Mfg. Co., Holland, Mich.
Imperial Damper Co., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Maple City Furnace Co., Monmouth, Ill.
Marsto Machine Co., West Quincy, Mass.
Minneapolis Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Rittling Corp., The, Buffalo, N. Y.
Round Oak Co., Inc., Dowagiac, Mich.
Seelye Craftsmen, The, Minneapolis, Minn.
Sioux Steel Co., Sioux Falls, S. D.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
United Sheet Metal Co., Inc., Columbus, O.
United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Inc., Waterloo, Ia.
Williamson Co., Cincinnati, O.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

Air-Path Products Co., Baltimore, Md.
Air & Refrigeration Corp., New York, N. Y
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo.
Anemostat Corp. of America, New York.
Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Buensod-Stacey, Inc., New York, N. Y.
Combustion Equipment Co., Moline, Ill.
Controlair Mfg. Co., Los Angeles, Calif.
Imperial Damper Co., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Maple City Furnace Co., Monmouth, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Rittling Corp., The, Buffalo, N. Y.
Seelye Craftsmen, The, Minneapolis, Minn.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Vapor Heating Corp., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DAMPERS, FIRE, FUSIBLE LINK

Air-Factors, Inc., Monrovia, Calif.
Air-Path Products Co., Baltimore, Md.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Ammerman Co., Inc., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Atmos Corp., Chicago, Ill.
Controlair Mfg. Co., Los Angeles, Calif.
Haertel Co., Walter, Minneapolis, Minn.
Imperial Damper Co., New York, N. Y.
Seelye Craftsmen, The, Minneapolis, Minn.
United Sheet Metal Co., Inc., Columbus, O.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, PULSATION, FOR PIPING SYSTEMS

Campbell Co., J. A., Long Beach, Calif.
Chemiquip Co., New York, N. Y.
Fluor Products Co., Whittier, Calif.
Greer Hydraulics, Inc., Jamaica, N. Y.
Industrial Acoustics Co., Inc., New York.
Taylor Instrument Companies, Rochester, N. Y.
United States Register Co., Battle Creek, Mich.

DEAERATORS

Acker Corp., Meridian, Miss.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Water Softener Co., Philadelphia.
Belco Industrial Equipment Div., Bogue Electric Mfg. Co., Paterson, N. J.
Cochrane Corp., Philadelphia, Pa.

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Elgin Softener Corp., Elgin, Ill.
Elliott Co., Jeannette, Pa.
General Filter Co., Ames, Ia.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Water Conditioning Co., New York
Hoppes Mfg. Co., Inc., Springfield, O.
Permutit Co., New York, N. Y.
Schaub Engineering Co., Fred H., Chicago
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Whitlock Mfg. Co., W. Hartford, Conn.
Worthington Corp., East Orange, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

Air Conditioning Engineering Co., Cambridge, Mass.
Anders-Lykens Corp., Div. of Milton Roy Co., Philadelphia, Pa.
Barnebey-Cheney Co., Columbus, O.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Cargocaire Engineering Corp., New York.
Desomatic Products, Inc., Falls Church, Va.
Dow Chemical Co., The, Midland, Mich.
Dryomatic Corp., Alexandria, Va.
Ellis & Watts Products, Inc., Cincinnati, O.
Floridin Co., Tallahassee, Fla.
Gannon Co., Inc., Russell R., The, Cincinnati, O.
Kaufman Co., H. J., Detroit, Mich.
Niagara Blower Co., New York, N. Y.
Pittsburgh Lectrodryer Co., Pittsburgh, Pa.
Socony-Mobil Oil Co., Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Tamms Industries Co., Chicago, Ill.

DEHUMIDIFIERS FOR COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Anders-Lykens Corp., Div. of Milton Roy Co., Philadelphia, Pa.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Centrifix Corp., Cleveland, O.
Desomatic Products, Inc., Falls Church, Va.
Dryomatic Corp., Alexandria, Va.
Ellis & Watts Products, Inc., Cincinnati, O.
Gannon Co., Inc., Russell R., The, Cincinnati, O.
Kaufman Co., H. J., The, Detroit, Mich.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Perfecting Service Co., Charlotte, N. C.
Pittsburgh Lectrodryer Co., Pittsburgh, Pa.
Pritchard & Co. of California, J. F., Kansas City, Mo.
Selas Corp. of America, Dresher, Pa.

DEHUMIDIFIERS, ELECTRIC PLUG-IN, FOR SMALL SPACES

Abbeon Supply Co., Jamaica, N. Y.
Admiral Corp., Chicago, Ill.
Blissfield Mfg. Co., Blissfield, Mich.
Cargocaire Engineering Corp., New York, N. Y.
Desomatic Products, Inc., Falls Church, Va.
Dryomatic Corp., Alexandria, Va.
Ebco Mfg. Co., Columbus, O.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Company, Div. of Cory Corp., Chicago, Ill.
Gannon Co., Inc., Russell R., The, Cincinnati.
Gibson Refrigerator Co., Greenville, Mich.
Haertel Co., Walter, Minneapolis, Minn.
McGraw-Edison Co., Lonergan Coolerator Div., Albion, Mich.
Mitchell Mfg. Co., Chicago, Ill.
Radio Corp. of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Taylor Co., Halsey W., Warren, O.
Walton Laboratories, Inc., Irvington, N. J.
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.
Whirlpool Corp., St. Joseph, Mich.

DEHUMIDIFIERS, SPRAY

See Washers, Air

DEHUMIDIFIERS, SPRAYED COIL

Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

DEHUMIDIFYING UNITS

See Units, Air Conditioning; Dehumidifiers

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

Allin Mfg. Co., Chicago, Ill.
Berna Corp., Garwood, N. J.
Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore, Md.
Highside Chemicals, Inc., Clifton, N. J.
McIntire Co., The, Livingston, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.

DEHYDRATORS, REFRIGERANT

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Aluminum Co. of America, Pittsburgh, Pa.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Berna Corp., Garwood, N. J.
Eagle Chemical Co., Inc., Chicago, Ill.
Fine Products Co., Berwyn, Ill.
Floridin Co., Tallahassee, Fla.
Frigidaire Div., General Motors Corp., Dayton, O.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kenmore Machine Products, Inc., Lyons, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Madden Brass Products Co., Aurora, Ill.
McIntire Co., The, Livingston, N. J.
Mueller Brass Co., Port Huron, Mich.
Refrigeration Research, Inc., Brighton, Mich.
Remco, Inc., Zelienople, Pa.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Tube Manifold Corp., North Tonawanda, N. Y.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Wabash Corp., Chicago, Ill.

DENSIFIERS, CONCRETE, FOR INCREASING THERMAL CONDUCTIVITY

Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.

DESTROYERS, SOOT, CHEMICAL

Allen Co., Robert G., Mechanicsville, N. Y.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Bird-Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Coughlan Co., G. N., West Orange, N. J.
General Filters, Inc., Novi, Mich.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Madison, N. J.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., Cleveland, O. (flue and chimney cleaners)
Nutmeg Chemical Co., New Haven, Conn.
Perolin Co., Inc., New York, N. Y.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Smith Chemical Co., E. W., La Puente, Calif.
Tamms Industries Co., Chicago, Ill.
Warren Refining & Chemical Co., The, Cleveland, O.

DESUPERHEATERS, STEAM

Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Foster Wheeler Corp., New York, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Springfield Boiler Co., Springfield, Ill.
Whitlock Mfg. Co., W. Hartford, Conn.

DETECTORS, CARBON MONOXIDE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.

DETECTORS, LEAK, FUEL OIL

American Gas & Chemicals, Inc., Leak-Tec Div., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Yula Water Heaters, Inc., Bronx, N. Y.

DETECTORS, LEAK, PIPING

American Gas & Chemicals, Inc., Leak-Tec Div., New York, N. Y. (gas, hydrogen, nitrogen, oxygen, ammonia, chloride)
Met-L-Chek Co., Los Angeles, Calif.
Smith Chemical Co., E. W., La Puente, Calif.
Universal Controls Corp., Dallas, Tex.
Zaco Labs., Div. of Zip Abrasive Co., Cleveland, O.

DETECTORS, LEAK, REFRIGERANT

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Allin Mfg. Co., Chicago, Ill.
American Gas & Chemicals, Inc., Leak-Tec Div., New York, N. Y.
Berna Co., Otto, Rochester, N. Y.
Chicago Forging and Mfg. Co., Chicago, Ill.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Devco Engineering, Inc., Caldwell, N. J.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Goss Gas, Inc., Pittsburgh, Pa.
Highside Chemicals, Inc., Clifton, N. J.
Insto-Gas Corp., Detroit, Mich.
Justrite Mfg. Co., Chicago, Ill.
Kent-Moore Organization, Inc., Warren, Mich.
Lenk Mfg. Co., Franklin, Ky.
Linde Co., Div of Union Carbide Corp., New York, N. Y.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Turner Brass Wks., Sycamore, Ill.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Velocity Power Tool Co., Div. of Mine Safety Appliances Co., Pittsburgh, Pa.
Weldit, Inc., Detroit, Mich.

DETECTORS, LEAK, UNDERGROUND PIPING

Fisher Research Laboratory, Inc., Palo Alto, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Globe Phone Mfg. Co., Reading, Mass.
Johnson-Williams Inc., Palo Alto, Calif.
Mine Safety Appliance Co., Pittsburgh, Pa.

DEVICES, ELECTROLYTIC, FOR PREVENTING CORROSION

American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Brown-Electro Co., Oklahoma City, Okla.
Division Lead Co., Summit, Ill.
Electro Rust-Proofing Corp., Belleville, N. J.
Engelhard, Inc., Charles, East Newark, N. J.
Harco Corp., Bedford, O.
Magnode Products, Inc., Trenton, O.
Marlo Coil Co., St. Louis, Mo.
May Company, Galesburg, Ill.
Metal & Thermit Corp., Rahway, N. J.

National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
Rotometals, San Francisco, Calif.
Steelcote Mfg. Co., St. Louis, Mo.
Wallace & Tiernan Inc., Belleville, N. J.

DEW POINT INDICATORS

See Indicators, Dew Point

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR, BASEBOARD

A. & A. Register Co., Cleveland, O.
Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovia, Calif.
Airfloor Co. of California, Inc., Norwalk, Calif.
Auer Register Co., Cleveland, O.
Coleman Co., Inc., The, Wichita, Ks.
Corbman Bros., Inc., Philadelphia, Pa.
General Register Corp., Cedar Grove, N. J.
Hart & Cooley Mfg. Co., Holland, Mich.
Heating Assurance, Inc., Spokane, Wash.
Independent Register Co., Cleveland, O.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lima Register Co., Lima, O.
Midco Register Corp., St. Paul, Minn.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Titus Mfg. Corp., Waterloo, Ia.
United States Register Co., Battle Creek, Mich.
Universal Diffuser Corp., Tuckahoe, N. Y.
Viking Mfg. Corp., Cleveland, O.

DIFFUSERS, AIR, CEILING

See also Grilles; Panels, Perforated, for Air Diffusions; Registers

A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Air Distribution Products Co., Los Angeles, Calif.
Air-Factors, Inc., Monrovia, Calif.
Airfan Engineering Co., Los Angeles, Calif.
Anemostat Corp. of America, New York, N. Y.
Ashburn Supply Co., Culver City, Calif.
Auer Register Co., Cleveland, O.
Austin Engineering & Mfg. Co., Inc., Ysleta, Tex.
B-G Engineering Co., Houston, Tex.
Barber-Colman Co., Rockford, Ill.
Carnes Corp., Verona, Wis.
Coleman Co., Inc., The, Wichita, Ks.
Connor Engineering Corp., Danbury, Conn.
Demuth & Sons, Inc., Charles, Mineola, L. I., N. Y.
Gallaher Co., The, Omaha, Neb.
Hart & Cooley Mfg. Co., Holland, Mich.
Independent Register Co., Cleveland, O.
Krueger Air Conditioning Co., Tucson, Ariz.
Lima Register Co., The, Lima, O.
Midco Register Corp., St. Paul, Minn.
Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Smith Co., J. B., Philadelphia, Pa.
Thermotank, Inc., Products Div., Detroit, Mich.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Universal Diffuser Corp., Tuckahoe, N. Y.
Viking Mfg. Corp., Cleveland, O.
Young Regulator Co., Cleveland, O.

DIFFUSERS, AIR, CEILING WITH COMBINED LIGHTING FIXTURE

Air Devices, Inc., New York, N. Y.
Air-Factors, Inc., Monrovia, Calif.
Anemostat Corp. of America, New York.
Barber-Colman Co., Rockford, Ill.
Carnes Co., Verona, Wis.
Connor Engineering Corp., Danbury, Conn.
Demuth & Sons, Inc., Charles, Mineola, L. I., N. Y.
Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Thermotank, Inc., Products Div., Detroit, Mich.
Titus Mfg. Corp., Waterloo, Iowa.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Universal Diffuser Corp., Tuckahoe, N. Y.
Wakefield Co., The, Vermilion, O.

DIFFUSERS, AIR, FLOOR

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Auer Register Co., Cleveland, O.
Coleman Co., Inc., The, Wichita, Ks.
Hart & Cooley Mfg. Co., Holland, Mich.
Independent Register Co., Cleveland, O.
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Lima Register Co., Lima, O.
Ritter Pattern & Casting Co., Inc., New York.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Titus Mfg. Corp., Waterloo, Ia.
United States Register Co., Battle Creek, Mich.
Universal Diffuser Corp., Tuckahoe, N. Y.

DIFFUSERS, AIR, HIGH PRESSURE

Air Devices, Inc., New York, N. Y.
American Warming & Ventilating Co., Toledo, O.
Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Coleman Co., Inc., The, Wichita, Ks.
Connor Engineering Corp., Danbury, Conn.
Independent Register Co., Cleveland, O.
Lima Register Co., Lima, O.
Thermotank, Inc., Products Div., Detroit, Mich.
Titus Mfg. Corp., Waterloo, Iowa
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Universal Diffuser Corp., Tuckahoe, N. Y.

DIFFUSERS, AIR, WALL

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Air Distribution Products Co., Los Angeles.
Air-Factors, Inc., Monrovia, Calif.
American Warming & Ventilating Co., Toledo, O.
Anemostat Corp. of America, New York, N. Y.
Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bowman Co., D. F., New Albany, Ind.
Coleman Co., Inc., The, Wichita, Ks.
Demuth & Sons, Inc., Charles, Mineola, L. I., N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Independent Register Co., Cleveland, O.
Lima Register Co., Lima, O.
Louvra Mfg. & Sales Co., Union, N. J.
Midco Register Corp., St. Paul, Minn.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Thermotank, Inc., Products Div., Detroit, Mich.
Titus Mfg. Corp., Waterloo, Ia.
United States Register Co., Battle Creek, Mich.
Universal Diffuser Corp., Tuckahoe, N. Y.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, REFRIGERANT, FOR COOLING COILS

General Controls Co., Glendale, Calif.
Lewis & Saunders, Lakeport, N. H.
Refrigeration Research, Inc., Brighton, Mich.
Sporlan Valve Co., St. Louis, Mo.

DISTRIBUTORS, WATER, FOR CONDENSERS

Hubbell Corp., Mundelein, Ill.
Lewis & Saunders, Lakeport, N. H.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

Adams Co., The, Dubuque, Ia.
Air-Path Products Co., Baltimore, Md.
Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Metal Works, Inc., New Orleans, La.
Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Camloc Fastener Corp., Paramus, N. J. (Fasteners for access panels and sheet metals)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Clarage Fan Co., Kalamazoo, Mich.
Falstrom Co., Passaic, N. J.
Haertel Co., Walter, Minneapolis, Minn.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Knapp Bros. Mfg. Co., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Technical Ply-Wood Sales, Chicago, Ill.
Ventfabrics, Inc., Chicago, Ill.
Walsh Co., L. M., The, Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)
Willis Steel Corp., Galesburg, Ill.
Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

DOORWAYS, AIR CURTAIN, FOR LARGE ENTRANCES

(Including nozzles, fans, ducts, heating and cooling coils, etc.)

American Air Curtain Corp., St. Louis, Mo.

DOUBLE DUCT MIXING UNITS, SOUND AND VOLUME CONTROL, FOR AIR CONDITIONING SYSTEMS

See Units, Mixing, Sound and Volume Control, for Double Duct High Velocity Air Conditioning Systems

DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAINS, TANK, FOR HOT WATER HEATING SYSTEM EXPANSION TANKS

Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Quality Specialty Co., Inc., Camden, N. J.
Richmond Engineering Co., Richmond, Va.
Thrush & Co., H. A., Peru, Ind.

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRIERS

See Dehydrators, Refrigerant

DRILLS, ELECTRIC AND PNEUMATIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
Black & Decker Mfg. Co., Towson, Md.
Buckeye Tools Corp., Dayton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Dayton Electric Mfg. Co., Chicago, Ill.
Demo-Haines Tool Corp., Enid, Okla.
Gardner-Denver Co., Quincy, Ill.
Hydrauger Corp., Ltd., San Francisco, Calif.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co. Pittsburgh, Pa.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Molco Drilling Machines, Inc., Washington, D.C.
Nielsen, Inc., E. V., Stamford, Conn.

Oster Mfg. Co., John, Milwaukee, Wis.
Phillips Drill Co., Michigan City, Ind.
Portable Electric Tools, Inc., Chicago, Ill.
Porter-Cable Machine Co., Syracuse, N. Y.
Rotor Tool Co., Cleveland, O.
Schramm, Inc., West Chester, Pa.
Skil Corp., Chicago, Ill.
Speedway Mfg. Co., Div. of Thor Power Tool Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Stanley Works, The, New Britain, Conn.
Tempo Products Co., Cleveland, O.
Thor Power Tool Co., Chicago, Ill.
U. S. Electrical Tool Co., Cincinnati, O.
Wodack Electric Tool Corp., Chicago, Ill.
Worthington Corp., East Orange, N. J.

DRILLS, MASONRY

Arro Expansion Bolt Co., Marion, O.
Chicago Expansion Bolt Co., Chicago, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Demo-Haines Tool Corp., Enid, Okla.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Diamond Products, Inc., Elyria, O.
DoAll Co., The, Des Plaines, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hamlin Co., Inc., J. F., San Francisco, Calif.
Holub Industries, Inc., Sycamore, Ill.
Ideal Industries, Inc., Sycamore, Ill.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Molco Drilling Machines, Inc., Washington, D. C.
New England Carbide Tool Co., Inc., Medford, Mass.
Nielsen, Inc., E. V., Stamford, Conn.
Paine Co., Addison, Ill.
Phillips Drill Co., Michigan City, Ind.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Rawlplug Co., Inc., The, New Rochelle, N. Y.
Schramm, Inc., West Chester, Pa.
Star Expansion N. Y., Inc., New York, N. Y.
Super Tool Co., Detroit, Mich.
Tempo Products Co., Cleveland, O.
Termite Drills, Inc., Pasadena, Calif.
Thor Power Tool Co., Chicago, Ill.
Threadwell Tap & Die Co., Greenfield, Mass.
U. S. Expansion Bolt Co., York, Pa.
Wheel Trueing Tool Co., Detroit, Mich.
Williams & Co., J. H., Buffalo, N. Y.
Wodack Electric Tool Corp., Chicago, Ill.

DRIVES, CHAIN

Boston Gear Works, Quincy, Mass.
Browning Mfg. Co., Maysville, Ky.
Chain Belt Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Jeffrey Mfg. Co., Columbus, O.
Link Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Ramsey Chain Co., Inc., Albany, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Whitney Chain Co., Hartford, Conn.

DRIVES, COOLING TOWER FAN

Cleveland Worm & Gear Co., Cleveland, O.
Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich.
Doerr Electric Corp., Cedarburg, Wis.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Pritchard & Co. of California, J. F., Kansas City, Mo.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Maysville, Ky.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Goodrich Industrial Products Co., Akron, O.
New York Belting & Packing Co., Passaic, N. J.
Pyott Foundry & Machine Co., Chicago, Ill.
Rhoads & Sons, J. E., Wilmington, Del.

Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, FLUID OR HYDRAULIC, FOR POWER TRANSMISSION

American Blower Corp., Detroit, Mich.
Dodge Mfg. Corp., Mishawaka, Ind.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich.
Link Belt Co., Chicago, Ill.
Sundstrand Hydraulic Div., Rockford, Ill.
Twin Disc Clutch Co., Rockford, Ill.
Warner Electric Brake & Clutch Co., Beloit, Wis.
Will-O-Hill Industries, Inc., Willoughby, O.

DRIVES, GEAR

Boston Gear Works, Quincy, Mass.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich.
Falk Corp., Milwaukee, Wis.
Hewitt-Robins, Inc., Stamford, Conn.
Lima Electric Motor Co., Inc., The, Lima, O.
Link-Belt Co., Chicago, Ill.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Pyott Foundry & Machine Co., Chicago, Ill.
Reliance Electric Engineering Co., Cleveland, O.
U. S. Electrical Motors, Inc., Los Angeles, Calif.

DRIVES, POWER FOR PIPE THREADING

Beaver Pipe Tools, Inc., Warren, O.
Oster Mfg. Co., Cleveland, O.
Ridge Tool Co., Elyria, O.
Toledo Pipe Threading Machine Co., Toledo, O.

DRIVES, SHAFT MOUNTED

American Pulley Co., The, Philadelphia, Pa.
Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich.
Falk Corp., Milwaukee, Wis.
Link-Belt Co., Chicago, Ill.
Philadelphia Gear Works, Inc., Philadelphia, Pa.

DRIVES, V BELT

Allis-Chalmers Mfg. Co., Milwaukee, Wis. (variable pitch)
American Pulley Co., Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Maysville, Ky.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Dayton Rubber Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Industrial Products Co., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Jones Machinery Div., Hewitt-Robins, Inc., Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
Pyott Foundry & Machine Co., Chicago, Ill.
Speed Selector Inc., Chagrin Falls, O.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
V-Belt Clutch Co., Los Angeles, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., East Orange, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

DRYERS FOR COMPRESSED AIR

See Dehumidifiers for Compressed Air

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Aerotec Corp., The, Greenwich, Conn.
Air & Refrigeration Corp., New York, N. Y.
Beltran Associates, Inc., Brooklyn, N. Y.
Biggs Boiler Works Co., The, E. Akron, O.
Blaw Knox Co., Buflovak Equipment Div., Buffalo, N. Y.
Bowen Engineering, Inc., North Branch, N. J.
Combustion Engineering Inc., New York, N. Y.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Dryer Electric Corp., Fan Div., Brooklyn, N.Y.
Drying Systems Co., Chicago, Ill.
Griffin & Co., Louisville, Ky.
Jeffrey Mfg. Co., Columbus, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Link-Belt Co., Chicago, Ill.
Louisville Drying Machinery Unit, General American Transportation Corp., Louisville, Ky.
Mahon Co., R. C., The, Detroit, Mich.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis. (rotary)
Midland-Ross Corp., New York, N.Y.
Newcomb-Detroit Co., Detroit, Mich.
Niagara Blower Co., New York, N. Y.
Peters-Dalton, Inc., Detroit, Mich.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Raymond Div., Combustion Engineering Inc., Chicago, Ill.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Precipitation Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa. (electric)

DRYERS, REFRIGERANT

See Dehydrators, Refrigerant

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT FURNACES

See Heaters, Duct

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT SILENCERS

See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, FLEXIBLE, METALLIC

American Metal Hose Div., The American Brass Co., Waterbury, Conn.
Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.
Buckeye Furnace Pipe Co., Columbus, O.
Coleman Co., Inc., The, Wichita, Kans.
Flexonics Corp., Maywood, Ill.
Littleford Bros., Inc., Cincinnati, O.
Round Oak Co., Inc., Dowagiac, Mich.
Solar Aircraft Co., San Diego, Calif.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.

DUCTS AND DUCT FITTINGS, PREFABRICATED, FLEXIBLE, NON-METALLIC

American Agile Corp., Bedford, O.
Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.

Corite Products, Inc., Chicago, Ill. (plastic)
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Flexaust Co., New York, N. Y.
Flexible Tubing Corp., Guilford, Conn.
Owens-Corning Fiberglas Corp., Toledo, O.
United States Rubber Co., New York, N. Y.
Wiremold Co., Hartford, Conn.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-FLEXIBLE, METALLIC

Acer & Whedon, Inc., Medina, N. Y.
Airfloor Co. of California, Inc., Norwalk, Calif.
Armstrong Fittings Co., Des Moines, Ia.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Champion Furnace Pipe Co., Peoria, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Corbman Bros., Inc., Philadelphia, Pa.
Ervite Corp., Erie, Pa. (enamel lined or glass coated for corrosive fume removal systems)
Excelsior Steel Furnace Co., The, Chicago, Ill.
General Metals, Inc., Greensboro, N. C.
Henry Furnace Co., The, Medina, O.
Inland Steel Products Co., Milwaukee, Wis.
Lennox Industries Inc., Columbus, O.
Lennox Industries Inc., Marshalltown, Ia.
Meyer & Bro. Co., F., Peoria, Ill.
Mueller Climatrol, Div of Worthington Corp., Milwaukee, Wis.
Olsen Mfg. Co., C. A., Elyria, O.
Pressure Airduct Corp., Skokie, Ill. (for high velocity systems)
United States Register Co., Battle Creek, Mich.
Williamson Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-FLEXIBLE, NON-METALLIC

American Agile Corp., Bedford, O.
Atlas Mineral Products Co., Mertztown, Pa.
Ceilcote, Inc., Cleveland, O.
Coleman Co., Inc., The, Wichita, Ks.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (Unplasticized polyvinyl chloride)
DuVerre, Inc., Buffalo, N.Y. (polyester bonded fiber glass)
General Ceramics Corp., Keasbey, N. J. (plastic)
Goethel Sheet Metal Wks., Inc., Alfred, Milwaukee, Wis.
Goodrich Industrial Products Co., B. F., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Haveg Industries, Inc., Newark, Del. (for fumes)
Heil Process Equipment Corp., Cleveland, O.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Johns-Manville, New York, N. Y.
Knight, Maurice A., Akron, O. (acid-proof)
Met-L-Wood Corp., Chicago, Ill. (combination wood and sheet metal)
Molded Fiber Glass Sheet Co., Ashtabula, O.
Robinson Clay Product Co., The, Akron, O.
S & C Mfg. Co., Cincinnati, O. (plastic)
Sonoco Products Co., Hartsville, S. C.
Straitsville Brick Co., New Straitsville, O.
United States Rubber Co., New York, N. Y.

DUCTS, FLEXIBLE

See Ducts and Duct Fittings, Prefabricated, Flexible, Non-Flexible, Metallic and Non-Metallic

DUCTS, SPIRAL WELDED

Carrier Corp., Syracuse, N.Y.
United Sheet Metal Co., Columbus, O.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

DYE PENETRANT

See Penetrant, Dye

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Buxton Mfg. Co., Dover, N. J.
Combustion Engineering Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Ellicott Fabricators, Inc., Baltimore, Md.
Foster Wheeler Corp., New York, N. Y.
Green Fuel Economizer Co., Inc., The, Beacon, N. Y.
Richmond Engineering Co., Richmond, Va.
Springfield Boiler Co., Springfield, Ill.
Union Iron Works, Erie, Pa.

EJECTORS, SEWAGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Nash Engineering Co., South Norwalk, Conn.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Swaby Mfg. Co., Chicago, Ill.
Weil Pump Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

ELBOWS AND TEES, BALANCING, FOR HOT WATER HEATING AND CHILLED WATER SYSTEMS

Detroit Controls Corp., Detroit, Mich.
Dunham-Bush, Inc., West Hartford, Conn.
Hammond Brass Works, Hammond, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis.
Kehm Corp., The, Chicago, Ill.
New York Brass Foundry, New York, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.

ELECTRIC AIR CLEANERS

See Filters, Air, Electrostatic (with outside power source)

ELECTRIC BOILERS AND STEAM GENERATORS

See Generators, Steam, Electric

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC PIPE HEATING SYSTEMS

See Systems, Electric Pipe Heating

ELECTRIC RADIANT HEATING

See Conductors and Panels, Electrical, for Radiant Heating

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRICAL AIR FILTERS

See Filters, Air, Electrostatic (with outside power source)

ELECTRODES, ARC WELDING

Air Reduction Co., Inc., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alloy Rods Co., York, Pa.
American Brass Co., Waterbury, Conn.
American Steel & Wire Div., United States Steel, Cleveland, O.
Ampco Metals, Inc., Milwaukee, Wis.
Arcos Corp., Philadelphia, Pa.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Burdett Oxygen Co. of Calif., Huntington Park, Calif.
Central Steel & Wire Co., Chicago, Ill.
Crucible Steel Co. of America, Pittsburgh, Pa.
Eutectic Welding Alloys Corp., Flushing, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
International Nickel Co., Inc., The, New York, N. Y.
Laclede Steel Co., St. Louis, Mo.
Lincoln Electric Co., Cleveland, O.
Linde Co., Div. of Union Carbide Corp., New York, N.Y.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., Rahway, N. J.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif. (for hard facing)
National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Sight Feed Generator Co., West Alexandria, O.
Smith Corp., A. O., Milwaukee, Wis.
Trindl Products, Ltd., Chicago, Ill.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Weldit, Inc., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa.

ELECTRODES, OIL BURNER

Auburn Sparkplug Co., Inc., Auburn, N. Y.
Crown Engineer Corp., Keyport, N. J.
Dielectric Products Co., Inc., Jersey City, N. J.
Steinen Mfg. Co., Wm., Newark, N. J.

ELECTROSTATIC AIR FILTERS

See Filters, Air, Electrostatic (with outside power source)

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Armstrong Machine Works, Three Rivers, Mich.
Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Bell & Gossett Co., Morton Grove, Ill.
Dole Valve Co., The, Morton Grove, Ill.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
General Automatic Products Corp., Baltimore, Md.
Gorton Heating Corp., Cranford, N. J.
Granberg Corp., Oakland, Calif.
Heat-Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kaye & McDonald, Inc., West Orange, N. J.
Keeney Mfg. Co., Newington, Conn.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Moreheat Distribution, Inc., Cincinnati, O.
Multiplex Mfg. Co., Berwick, Pa.
New York Air Valve Corp., Brooklyn, N. Y.
Quality Specialty Co., Inc., Camden, N. J.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Southern Plastics Co., Columbia, S. C.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Watkins Co., J. E., Maywood, Ill.
Webster & Co., Warren, Camden, N. J.

ELIMINATORS, SLUG, REFRIGERANT

Blazer & Son, M., Passaic, N. J.
Patterson-Kelley Co., The, East Stroudsburg, Pa.
Southern Plastics Co., Columbia, S. C.
Watkins Co., J. E., Maywood, Ill.

ENAMELS AND LACQUERS

Acorn Refining Co., Cleveland, O.
Arco Co., The, Cleveland, O.
Barreled Sunlight Paint Co., Providence, R. I.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y. (pipeline and waterworks enamels)
Blue Ridge Talc Co., Inc., Henry, Va.
Claronex Products, Inc., Brooklyn, N. Y.
Cordo Chemical Corp., Norwalk, Conn.
Corrosion Control Co., Inc., New York, N. Y.
Debevoise Co., The, Brooklyn, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
du Pont de Nemours & Co., E. I., Finishes Div., Wilmington, Del.
General Paint Corp., San Francisco, Calif.
Glidden Co., Nubian Div., Chicago, Ill.
Hague & Co., Inc., Alfred, Div. of Lacquer & Chemical Corp., Brooklyn, N. Y.
Heresite & Chemical Co., Manitowoc, Wis. (air dry phenolic & chlorinated rubber coatings)
Hilo Varnish Corp., Div. of Carpenter-Morton Co., Everett, Mass.
Horn Co., Inc., A. C., Subsidiary of Sun Chemical Corp., Long Island City, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Koppers Co., Inc., Pittsburgh, Pa.
Krylon, Inc., Norristown, Pa.
Master Mechanics Co., Cleveland, O.
Metal & Thermit Corp., Rahway, N. J.
National Lead Co., New York, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Ronor Corp., Cleveland, O. (Spray units)
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sandstrom Products Co., Port Byron, Ill.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Steelcote Mfg. Co., St. Louis, Mo.
Thompson and Co., Oakmont, Pa.
Tropical Paint Co., Cleveland, O.
Truscon Laboratories Div., Devoe & Raynolds Co., Inc., Detroit, Mich.
Valdura Div., American-Marietta Co., Chicago, Ill.
Warren Refining & Chemical Co., The, Cleveland, O.
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Brighton, Mass.
Wilhelm Co., A., Reading, Pa.

ENCLOSURES FOR PERIMETER AIR CONDITIONING SYSTEMS AND AIR CONDITIONING UNITS

Brandt & Co., Inc., Eugene J., Long Island City, N. Y.
Somers Corp., Detroit, Mich.

ENCLOSURES, RADIATOR

Brandt & Co., Inc., Eugene J., Long Island City, N. Y.
Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Hoff Mfg. Co., Bethany, New Haven, Conn.
Met-L-Wood Corp., Chicago, Ill.
Somers Corp., Detroit, Mich.
Stedco Products. Wilkes-Barre, Pa.
United Sheet Metal Co., Inc., Columbus, O.

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

Alco Products, Inc., Schenectady, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Anderson Diesel Engine Co., Philadelphia, Pa.
Berry-Hill Corp., Hill Diesel Engine Div., Providence, R. I.
Buda Div., Allis-Chalmers Mfg. Co., Harvey, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.
Fairbanks, Morse & Co., Chicago, Ill.
Hamilton Div., Baldwin-Lima-Hamilton Corp., Hamilton, O.
Harnischfeger Corp., Milwaukee, Wis.
Ingersoll-Rand Co., New York, N. Y.
Onan & Sons Inc., D. W., Minneapolis, Minn.
Ready-Power Co., The, Detroit, Mich.
Synchro-Start Products, Inc., Skokie, Ill. (automatic controls to start, stop and protect internal combustion engines)
Waukesha Motors Co., Waukesha, Wis.
Worthington Corp., East Orange, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Buda Div., Allis-Chalmers Mfg. Co., Harvey, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
LeRoi Div., Westinghouse Air Brake Co., Milwaukee, Wis.
Onan & Sons Inc., D. W., Minneapolis, Minn.
Ready-Power Co., The, Detroit, Mich.
Solar Aircraft Co., San Diego, Calif.
Synchro-Start Products, Inc., Skokie, Ill. (automatic controls to start, stop and protect internal combustion engines)
Waukesha Motor Co., Waukesha, Wis.
Worthington Corp., East Orange, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Wachs Co., E. H., The, Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.

EQUIPMENT, BALANCING

Bear Mfg. Co., Industrial Div., Rock Island, Ill. (dynamic)
Gisholt Machine Co., Madison, Wis.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

EQUIPMENT INSULATION

See Insulation, Boiler, Tank, and Equipment

EQUIPMENT, RADIOGRAPHIC INSPECTION

Fluor Products Co., Whittier, Calif.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

EVAPORATIVE COOLERS

See Units, Air Conditioning, Summer, Evaporative Cooling Type

EVAPORATORS

See Chillers, Water

EXCHANGERS, HEAT, FOR AIR TO AIR HEAT RECOVERY

See Units, Heat Recovery, Air to Air

EXCHANGERS, HEAT, SHELL AND TUBE

Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y. (liquid to gas)
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alco Products, Inc., Schenectady, N. Y.
Alstrom Corp., New York, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
Armstrong Co., Richard M., West Chester, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Beltran Associates, Inc., Brooklyn, N. Y.
Biggs Boiler Wks., Co., The, E. Akron, O.
Binks Mfg. Co., Chicago, Ill.
Blaw Knox Co., Buflovak Equipment Div., Buffalo, N. Y.
Buxton Mfg. Co., Dover, N. J.
California Steel Products, Div. of Yuba Consolidated Industries, Inc., Richmond, Calif.
Carrier Corp., Syracuse, N. Y.
Cleaver-Brooks Co., Milwaukee, Wis.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. Y.
Cooley Co., E. C., San Francisco, Calif.
Corning Glass Works, Corning, N. Y.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Dowingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Duriron Co., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Steel Foundry Co., Portland, Ore.
Ellicott Fabricators, Inc., Baltimore, Md.
Foster Wheeler Corp., New York, N. Y.
Frick Co., Waynesboro, Pa.
Gabriel Boiler Co., Portland, Ore.
General Fittings Co., East Greenwich, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Haveg Industries, Inc., Newark, Del. (plastic)
Heat-Exchangers, Inc., Chicago, Ill.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Heil Process Equipment Corp., Cleveland, O.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Industrial Filter & Pump Co., Chicago, Ill.
Kaiser Co., E. B., Glenview, Ill.
Kellogg Co., M. W., The, New York, N. Y.
Killebrew Engineering Corp., St. Louis, Mo.
Knapp Mills, Inc., Long Island City, N.Y.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lindy Heaters, Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
National-U. S. Radiator Corp., Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Nooter Corp., St. Louis, Mo.
Olin Mathieson Chemical Corp., Western Brass Mills Div., East Alton, Ill. (roll bond panels incorporating fluid passages)
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Process Engineering, Inc., Methuen, Mass.
Reco Products Div., Recony Corp., New York, N. Y.
Richmond Engineering Co., Richmond, Va.
Rite Engineering & Mfg. Corp., Downey, Calif.
Roessing Mfg. Co., Pittsburgh, Pa.
Ross Heat Exchanger Div., American Radiator & Standard Sanitary Corp., Buffalo, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shutt Process Equipment Corp., St. Louis, Mo.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Stout & Sons, David, St. Louis, Mo.

Struthers Wells Corp., Warren, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taco Heaters, Inc., Cranston, R. I.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Tranter Mfg., Inc., Lansing, Mich.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Union Iron Works, Erie, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vapor Heating Corp., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whitlock Mfg. Co., W. Hartford, Conn.
Wiegand Co., Edwin L., Pittsburgh, Pa. (electric)
Wilson Engineering Corp., Chicago, Ill.
Worthington Corp., East Orange, N. J.
Yates-American Machine Co., Heat Transfer Products Div., Beloit, Wis.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., Bronx, N. Y.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

Acme Industries, Inc., Jackson, Mich.
Armstrong Co., Richard M., West Chester, Pa.
Blazer & Son, M., Passaic, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Dole Refrigerating Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Frick Co., Waynesboro, Pa.
Heat-Exchangers, Inc., Chicago, Ill.
Heat More Tankless Heater Co., Cambridge, Mass.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kaiser Co., E. B., Glenview, Ill.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Research, Inc., Brighton, Mich.
Rempe Co., Chicago, Ill.
Super Radiator Corp., Minneapolis, Minn.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Trane Co., The, La Crosse, Wis.
Tranter Mfg. Inc., Lansing, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Corp., Chicago, Ill.
Watkins Co., J. E., Maywood, Ill.
Witt Co., A. H., Los Angeles, Calif.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUST VENTILATION FITTINGS

See Fittings, Exhaust, Garage, for Attaching Car Exhaust Pipe

EXHAUSTERS

See Units, Exhauster, Centrifugal Fan

EXHAUSTERS, WELDING FUME

Airfan Engineering Co., Los Angeles, Calif.
Aladdin Heating Corp., San Leandro, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blower Corp., Detroit, Mich.
American Machine Products Co., Marshalltown, Ia.
Ammerman Co., Inc., Minneapolis, Minn.
Atmos Corp., Chicago, Ill.
Barry Blower Co., Minneapolis, Minn.
Bertram Co., Harvey P., The, Cincinnati, O.
Black Mfg. Co., Livingston, N. J.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Day Co., The, Minneapolis, Minn.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Gallaher Co., The, Omaha, Neb.
General Blower Co., Morton Grove, Ill.
Jenn-Air Products Co., Indianapolis, Ind.
Kice Metal Products Co., Wichita, Kans.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kody Blower Co., Trenton, N. J.
M & E Mfg. Co., Indianapolis, Ind.
Martin Fan & Blower Co., Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Peters-Dalton, Inc., Detroit, Mich.
Ruemelin Mfg. Co., Milwaukee, Wis.
Torit Mfg. Co., St. Paul, Minn.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

EXPANDERS, TUBE

Burr Oak Tool & Gauge Co., Sturgis, Mich.
Chicago Pneumatic Tool Co., New York, N. Y.
Crane Packing Co., Morton Grove, Ill.
Elliott Co., Jeannette, Pa.
Hill, Inc., Walter P., Detroit, Mich.
Talon Tools, Inc., North Arlington, N. J.
Vernon Tool Co., Ltd., Alhambra, Calif.
Wilson, Inc., Thomas C., Long Island City, N. Y.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

EXTENSIONS, FURNACE, WATER WALL, FOR BOILERS

Crotty Mfg. Corp., Flushing, L. I., N. Y.

EXTRACTORS, PIPE

Chicago Specialty Mfg. Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass
Ridge Tool Co., Elyria, O.
Roddick Tool Co., Anaheim, Calif.
Talon Tools, Inc., North Arlington, N. J. (internal wrenches)
Walton Co., Hartford, Conn.

FABRICATED PIPING

See Bends; Headers; etc.

FABRICATORS, PIPE

See Headers, Pipe, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN-COIL UNITS

See Units, Air Conditioning, Year Around, Fan-Coil Type

FAN HOUSINGS

See Housings, Fan, Centrifugal

FANS, AXIAL FLOW, PRESSURE TYPE

Aerovent Fan Co., Inc., Piqua, O. (Tubeaxial and vanexial)
Alloy Propeller, Zelionople, Pa. (Tubeaxial)
American Blower Corp., Detroit, Mich. (tubeaxial and vaneaxial)
Bahnson Co., Winston-Salem, N. C. (Vaneaxial)
Bertram Co., Harvey P., The, Cincinnati, O.
Buffalo Forge Co., Buffalo, N. Y.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J. (tubeaxial)
Chicago Blower Corp., Franklin Park, Ill. (tubeaxial)
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Detroit Blower Corp., Franklin Park, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Electric Boat Co., Groton, Conn. (vaneaxial)
General Blower Co., Morton Grove, Ill.
Hartzell Propeller Fan Co., Piqua, O. (tubeaxial and vaneaxial)
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Plastic Fabricators, Norwood, Mass. (PVC) (tubeaxial)
International Engineering Inc., Dayton, O.
Joy Mfg. Co., Pittsburgh, Pa. (vaneaxial)
Kody Blower Co., Trenton, N. J. (tubeaxial and vaneaxial)
Lennox Industries Inc., Marshalltown, Ia. (vaneaxial)
M & E Mfg. Co., Indianapolis, Ind. (tubeaxial)
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif. (tubeaxial & vaneaxial)
Moore Co., The, Marceline, Mo. (tubeaxial and vaneaxial)
Penn Ventilator Co., Philadelphia, Pa. (tubeaxial)
Propellair Div., Robbins & Myers, Inc., Springfield, O. (tubeaxial and vaneaxial)
Reed Unit-Fans, Inc., New Orleans, La. (tubeaxial)
Robinson Ventilating Co., Zelienople, Pa. (tubeaxial)
South Bend Air Products, Inc., South Bend, Ind.
Stanat Mfg. Co., Inc., Westbury, N. Y. (vaneaxial—2 to 6 in. diameter)
Standard Electric Mfg. Co., West Berlin, N. J. (tubeaxial)
Trade-Wind Motorfans, Inc., Rivera, Calif.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J. (tubeaxial and vaneaxial)

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Air Conditioning Engineering Co., Cambridge, Mass.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airfan Engineering Co., Los Angeles, Calif.
Airwasher Corp., Eaton Rapids, Mich.
Aladdin Heating Corp., San Leandro, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
Alloy Propeller, Zelionople, Pa. (Stainless Steel)
American Agile Corp., Bedford, O.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Ia.
Ammerman Co., Inc., Minneapolis, Minn.
Barry Blower Co., Minneapolis, Minn.
Bate Soot Blower Div., General Blower Co., Inc., Philadelphia, Pa.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Bronson Fan Mfg. Corp., Los Angeles, Calif.
Brookside Corp., McCordsville, Ind.
Brundage Co., The, Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Burdett Mfg. Co., Chicago, Ill.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Carling Turbine Blower Co., Worcester, Mass.
Carolina Blower Co., Inc., Greensboro, N. C. (shaving exhauster)
Carrier Corp., Syracuse, N. Y.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.

Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Commercialaire Corp. of America, Brooklyn, N. Y.
Cook Co., Loren, Berea, O.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Dayton Electric Mfg. Co., Chicago, Ill.
Dryer Electric Corp., Fan Div., Brooklyn, N. Y.
Duriron Co., Inc., Dayton, O. (Acid resisting)
DuVerre, Inc., Buffalo, N. Y. (plastic)
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
Frigid, Inc., Brooklyn, N. Y.
Gallaher Co., The, Omaha, Neb.
Garden City Fan Co., Niles, Mich.
General Blower Co., Morton Grove, Ill.
General Ceramics Corp., Keasbey, N. J. (ceramics, plastic)
Green Fuel Economizer Co., Inc., The, Beacon, N. Y.
Hamilton Fan & Blower Co., Inc., Cincinnati, O.
Hartzell Propeller Fan Co., Piqua, O.
Heil Process Equipment Corp., Cleveland, O. Solid plastic and coated solid plastic, and rubber lined)
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Jackson & Church Co., Saginaw, Mich.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn-Air Products Co., Indianapolis, Ind.
Kice Metal Products Co., Wichita, Kans.
Lau Blower Co., Dayton, O.
Lennox Industries Inc., Marshalltown, Ia.
Magic Aire Div., United Electric Co., Wichita Falls, Tex.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Marlo Coil Co., St. Louis, Mo.
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
Morrison Products, Inc., Cleveland, O.
Mountain States Equipment Co., Denver, Colo.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National Engineering & Mfg. Co., Sedalia, Mo.
New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
Power Engineering Corp., Weirton, W. Va.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Redmond Co., Inc., Owosso, Mich.
Reynolds Mfg. Co., The, Comstock Park, Mich.
Revcor Inc., Carpentersville, Ill.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Robinson Ventilating Co., Zelienople, Pa.
Small Motors, Inc., Chicago, Ill. (small sizes)
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Trade-Wind Motorfans, Inc., Rivera, Calif.
Trane Co., The, LaCrosse, Wis.
Tuck-Aire Furnace Co., San Francisco, Calif.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Universal Electric Co., Owosso, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Viking Air Products, Div. of National-U. S. Radiator Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

FANS, MATERIALS HANDLING

Air Conditioning Engineering Co., Cambridge, Mass.
Airfan Engineering Co., Los Angeles, Calif.
Aladdin Heating Corp., San Leandro, Calif.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Century Fan & Ventilator Co., Stamford, Conn.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Detroit Blower Corp., Franklin Park, Ill.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Garden City Fan Co., Niles, Mich.
General Blower Co., Morton Grove, Ill.
Kice Metal Products Co., Wichita, Kans.
Kody Blower Co., Trenton, N. J.
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
Newcomb-Detroit Co., Detroit, Mich.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
Power Engineering Corp., Weirton, W. Va.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Robinson Ventilating Co., Zelienople, Pa.

FANS, MECHANICAL DRAFT, FOR BOILERS

American Blower Corp., Detroit, Mich.
Ammerman Co., Inc., Minneapolis, Minn.
Barry Blower Co., Minneapolis, Minn.
Bate Soot Blower Div., General Blower Co., Inc., Philadelphia, Pa.
Bayley Blower Co., Milwaukee, Wis.
Bertram Co., Harvey P., The, Cincinnati, O.
Bressler Engineering Service, Oregon, Ill.
Brookside Corp., McCordsville, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Century Fan & Ventilator Co., Stamford, Conn.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dryer Electric Corp., Fan Div., Brooklyn, N. Y.
Gallaher Co., The, Omaha, Neb.
Garden City Fan Co., Niles, Mich.
General Blower Co., Morton Grove, Ill.
Green Fuel Economizer Co., Inc., The, Beacon, N. Y.
International Engineering, Inc., Dayton, O
Kody Blower Co., Trenton, N. J.
Kol-Master Corp., Oregon, Ill.
Lehigh Fan & Blower Div., Fuller Co., Catasauqua, Pa.
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
Pacific Steel Boiler Div., National-U.S. Radiator Corp., Johnstown, Pa.
Plant Engineering & Equipment Co., Elizabeth, N. J.
Power Engineering Corp., Weirton, W. Va.
Quickdraft Co., Canton, O.
Robinson Ventilating Co., Zelienople, Pa.
Tjernlund Mfg. Co., St. Paul, Minn.
Walker Mfg. & Sales Co., St. Joseph, Mo.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitty Co., Inc., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

FANS, PROPELLER

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Allen Cooler & Ventilator, Inc., Rochester, Mich.
Alloy Propeller, Zelionople, Pa. (Stainless Steel)
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Ammerman Co., Inc., Minneapolis, Minn.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Belco Industries, Inc., St. Louis, Mo.
Bertram Co., Harvey P., The, Cincinnati, O.
Binks Mfg. Co., Chicago, Ill.
Bishop & Babcock Mfg. Co., Cleveland, O.
Broan Mfg. Co., Inc., Hartford, Wis.
Bronson Fan Mfg. Corp., Los Angeles, Calif.
Brookside Corp., McCordsville, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Burden Co., Alan E., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. Y.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Commercialaire Corp. of America, Brooklyn, N. Y.
Cook Co., Loren, Berea, O.
Coppus Engineering Corp., Worcester, Mass.
Dayton Electric Mfg. Co., Chicago, Ill.
De Bothezat Fans Div., American Machine & Metals, Inc., New York, N. Y.
Detroit Blower Corp., Franklin Park, Ill.
DeVilbiss Co., The, Toledo, O.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Donaldson Div., Marvin D. Shafer Co., Inc., Los Angeles, Calif.
Dynamic Air Engineering, Inc., Los Angeles.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fasco Industries, Inc., Rochester, N. Y.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Frigid, Inc., Brooklyn, N. Y.
Gallaher Co., The, Omaha, Nebr.
General Blower Co., Morton Grove, Ill.
Hartzell Propeller Fan Co., Piqua, O.
Hill Co., Francis, Cleveland, O.
Hunter Div., Robbins & Myers, Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn-Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kody Blower Co., Trenton, N. J.
Koppers Company, Inc., Metal Products Div., Baltimore, Md.
Lakewood Engineering & Mfg. Co., Chicago, Ill.
Lau Blower Co., Dayton, O.
M & E Mfg. Co., Indianapolis, Ind.
Magic Aire Div., United Electric Co., Wichita Falls, Tex.
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
McLarty Systems, Battle Creek, Mich.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Moore Co., The, Marceline, Mo.
Morrill Motors, Ft. Wayne, Ind.
Mountain States Equipment Co., Denver.
Muckle Mfg. Co., Owatonna, Minn.
Murray Co. of Texas, The, Atlanta, Ga.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Sedalia, Mo.
National Gas Equipment Co., Inc., Denison, Tex.
New York Blower Co., Chicago, Ill.
Norky Mfg. Co., Covington, Ky.
Peerless Electric Co., Warren, O.
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
Phoenix Fan & Blower Mfg. Co., Phoenix, Ariz.
Pritchard & Co. of California, J. F., Kansas City, Mo.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., River Grove, Ill.
Robinson Ventilating Co., Zelienople, Pa.
Schwitzer Corp., Indianapolis, Ind.
South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Sutton Corp., O. A., The, Wichita, Kan.
Swift Mfg. Co., Inc., Royal Oak, Mich.
Thermador Electrical Mfg., Los Angeles, Calif.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Trade-Wind Motorfans, Inc., Rivera, Calif.

Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
Viking Air Products, Div. of National-U. S. Radiator Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Venice, Calif.
Westinghouse Electric Corp., Electric Appliance Div., E. Springfield, Mass.
Wind-Way Fan & Ventilating Co., New Orleans, La.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

FASTENERS, INSULATION
Acme Steel Co., Chicago, Ill (steel strapping)
Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Gerrard & Co., A. J., Melrose Park, Ill.
Graham Mfg. Corp., Needham Hts., Mass.
Holub Industries, Inc., Sycamore, Ill.
Huck Mfg. Co., Detroit, Mich.
Lexsuco, Inc., Cleveland, O.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich.
Moore, Inc., Goodloe E., Danville, Ill.
Nelson Stud Welding Div., Gregory Industries Inc., Lorain, O.
Phillips Drill Co., Michigan City, Ind.
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., Cleveland, O. (powder-actuated)
Remington Arms Co., Inc., Bridgeport, Conn.
Stic-Klip Mfg. Co., Inc., Cambridge, Mass.
Taft-Jenkins Co., Inc., Holyoke, Mass.
Tinnerman Products, Inc., Cleveland, O.
United Carr Fastener Corp., Cambridge, Mass.

FASTENERS, POWDER OPERATED
du Pont de Nemours & Co., E. I., Wilmington, Del. (blind expansion)
Omark Industries, Portland, Ore.
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., Cleveland, O.
Remington Arms Co., Inc., Bridgeport, Conn.
Tempo Products Co., Cleveland, O.
Velocity Power Tool Co., Div. of Mine Safety Appliances Co., Pittsburgh, Pa.

FEEDFRS, CHEMICAL, PROPORTIONING
American Water Softener Co., **Philadelphia, Pa.**
Belco Industrial Equipment Div., Bogue Electric Mfg. Co., Paterson, N. J.
C C Pump Mfg. Div., Palmyra, N. J.
Calgon Co., Pittsburgh, Pa.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Elgin Softener Corp., Elgin, Ill.
Fischer & Porter Co., Hatboro, Pa.
Graver Water Conditioning Co., New York, N. Y.
Hills-McCanna Co., Chicago, Ill.
Hungerford & Terry, Inc., Clayton, N. J.
Jeffrey Mfg. Co., Columbus, O.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Myers & Bros. Co., F. E., The, Ashland, O.
Omega Machine Co., Div. of B-I-F Industries, Inc., Providence, R. I. (liquid and dry)
Permutit Co., New York, N. Y.
Philadelphia Pump Div., American Meter Co., **Philadelphia, Pa.**
Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Pulverizing Machinery Div., Metals Disintegrating Co., Inc., Summit, N. J.
Research Appliance Co., Allison Park, Pa.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Smith Chemical Co., E. W., La Puente, Calif.
Stiles Karlsonite Corp., Waukegan, Ill.
Wallace & Tiernan, Inc., Belleville, N. J.

FEEDERS, WATER, HEATING BOILER
Acker Corp., Meridian, Miss.
Bailey Co., Chas. M., San Francisco, Calif.
Calgon Co., Pittsburgh, Pa.
Campbell Co., J. A., Long Beach, Calif.

Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clayton Mark & Co., Evanston, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Morehead Moisture Control, Detroit, Mich.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Schaub Engineering Co., Fred H., Chicago, Ill.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

FEEDWATER HEATERS
See Deaerators

FIBER PACKING
See Packing, Fiber

FIBER PIPE
See Pipe, Fiber

FILTER GAGES
See Gages, Air Filter

FILTER OILS
See Oils, for Coating Viscous Air Filters

FILTERS, AIR, AUTOMATIC, DRY
Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
Continental Air Filters, Inc., Louisville, Ky.
Day Co., The, Minneapolis, Minn.
Ducon Co., Inc., The, Mineola, N. Y.
Farr Co., Los Angeles, Calif.
Flanders Filters, Inc., Riverhead, Long Island, N. Y.
Gray Co., Inc., Minneapolis, Minn.
Green Fuel Economizer Co., Inc., The, Beacon, N. Y.
Hanna Engineering Works, Chicago, Ill.
Trion, Inc., McKees Rocks, Pa.

FILTERS, AIR, AUTOMATIC, VISCOUS
Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.

FILTERS, AIR, ELECTRICAL
See Filters, Air, Electrostatic (with outside power source)

FILTERS, AIR, ELECTROSTATIC
(with outside power source)
Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
Dollinger Corp., Rochester N. Y.
Electro-air Cleaner Co., Inc., McKees Rocks, Pa.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Radex Corp., Chicago, Ill.
Trion, Inc., McKees Rocks, Pa.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

FILTERS, AIR, GREASE
Specifically designed for kitchen exhaust systems
Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Continental Air Filters, Inc., Louisville, Ky.
Cuno Engineering Co., Meriden, Conn.
Dollinger Corp., Rochester, N. Y.
Evans Corp., The, George, Moline, Ill.
Farr Co., Los Angeles, Calif.
Research Products Corp., Madison, Wis.
Smith Filter Corp., Moline, Ill. (Aluminum)
Trion, Inc., McKees Rocks, Pa.
Vortox Co., Claremont, Calif.

FILTERS, AIR, HIGH TEMPERATURE
(For use in filtering air at temperatures of 1000 *F and above)*
Cambridge Filter Corp., Syracuse, N.Y.
Farr Co., Los Angeles, Calif.
Flanders Filters, Inc., Riverhead, Long Island, N. Y.

FILTERS, AIR, PANEL, DRY
Air-Maze Corp., Cleveland, O.
Aluminum Wool Div., Carey Electronic Engineering Co., Springfield, O.
American Air Filter Co., Inc., Louisville, Ky.
Arco Mfg. Co., New York, N. Y.
Bahnson Co., Winston-Salem, N. C.
Cambridge Filter Corp., Syracuse, N. Y.
Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Continental Air Filters, Inc., Louisville, Ky.
Coppus Engineering Corp., Worcester, Mass.
Cuno Engineering Co., Meriden, Conn.
Dollinger Corp., Rochester, N. Y.
Drico Industrial Corp., Passaic, N. J.
Farr Co., Los Angeles, Calif.
Filt-R-Ite Co., Chicago, Ill.
Hadley Products Co., Inc., Marietta, O.
Master Products Co., Chicago, Ill.
Peden Equipment Co., Houston, Texas
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Research Products Corp., Madison, Wis.
Skuttle Mfg. Co., Milford, Mich.
Somers Corp., Detroit, Mich.
Star Woolen Co., Cohoes, N.Y.

FILTERS, AIR, PANEL, DRY, COMBINED WITH ACTIVATED CHARCOAL FOR ODOR CONTROL
Barnebey-Cheney Co., Columbus, O.
Flanders Filters, Inc., Riverhead, Long Island, N.Y.

FILTERS, AIR, PANEL, DRY, SUBMICRON PARTICULATE
Cambridge Filter Co., Syracuse, N. Y.
Farr Co., Los Angeles, Calif.
Flanders Filters, Inc., Riverhead, Long Island, N.Y.
Mine Safety Appliances, Pittsburgh, Pa.

FILTERS, AIR, PANEL WITH PLASTIC MEDIA
Besser Furnace and Air Conditioning Corp., Charlotte, N. C.
Continental Air Filters, Inc., Louisville, Ky.
Ducon Co., Inc., The, Mineola, N. Y.
Eaton Air Filter Co., Detroit, Mich.
Goodyear Tire & Rubber Co., Akron, O.
Microtron Corp., Charlotte, N. C.
Stoddard Industries, Inc., Chicago, Ill.

FILTERS, AIR, PANEL, VISCOUS
Air-Con Filter Co., Memphis, Tenn.
Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville.
Besser Furnace and Air Conditioning Corp., Charlotte, N.C.
Celanese Corp. of America, Charlotte, N. C.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Evans Corp., The, George, Moline, Ill.
Farr Co., Los Angeles, Calif.
Goodyear Tire & Rubber Co., Akron, O.
Research Products Corp., Madison, Wis.
Smith Filter Corp., Moline, Ill. (Aluminum)
Vortox Co., Claremont, Calif.

FILTERS, AIR, THROW-AWAY
Airgard Mfg. Co., Chicago, Ill.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
Arco Mfg. Corp., New York, N. Y.
Bowman Co., D. F., New Albany, Ind. (Special sizes)
C.L.B. Co., Houston, Tex.
Cambridge Filter Corp., Syracuse, N. Y. (replaceable cartridge)
Cuno Engineering Co., Meriden, Conn.

Drico Industrial Corp., Passaic, N. J.
Eaton Air Filter Co., Detroit, Mich.
Farr Co., Los Angeles, Calif.
Fiber Bond Corp., Chicago, Ill.
Filt-R-Ite Co., Chicago, Ill.
Flanders Filters, Inc., Riverhead, Long Island, N. Y. (special purpose filters)
Microtron Corp., Charlotte, N. C.
Mine Safety Appliances Co., Pittsburgh, Pa.
Owens-Corning Fiberglas Corp., Toledo, O.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Technical Filter Co., Chicago, Ill.
Wilson & Co., Inc., Chicago, Ill.

FILTERS, AIR, THROW-AWAY COMBINED WITH ACTIVATED CHARCOAL FOR ODOR CONTROL

Barnebey-Cheney Co., Columbus, O.

FILTERS FOR OIL BURNERS

Andale Co., Philadelphia, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Commercial Filters Corp., Melrose, Mass.
Cuno Engineering Corp., Meriden, Conn.
Delavan Mfg. Co., West Des Moines, Ia.
Eddington Metal Specialty Co., Eddington, Pa.
Fram Corp., Providence, R. I.
General Filters, Inc., Novi, Mich.
Hauck Mfg. Co., Brooklyn, N. Y.
Hilliard Corp., Elmira, N. Y.
Kraissl Co., Inc., The, Hackensack, N. J.
Marvel Engineering Co., Chicago, Ill.
McIntire Co., The, Livingston, N. J.
Morse-Smith-Morse Co., The, Watertown, Mass.
Newark Wire Cloth Co., Newark, N. J.
Norwood Products Co., Div. of A. R. Wood Mfg. Co., Luverne, Minn.
Pacific States Felt & Mfg. Co., San Francisco, Calif.
Purolator Products, Inc., Rahway, N. J.
Rega Mfg. Co., Rochester, N. Y.
Sette Products Co., Oakland, Calif.
Sparkler Mfg. Co., Mundelein, Ill.
Unifilter Co., Novi, Mich.
W. G. B. Oil Clarifier, Inc., Kingston, N. Y.
Winslow Engineering & Mfg. Co., Oakland, Calif.
Wood Mfg. Co., A. R., Luverne, Minn.

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Adams Co., Inc., R. P., Buffalo, N. Y.
Airaterra (Roylyn Products), Glendale, Calif.
Air-Maze Corp., Cleveland, O.
Alco Products, Inc., Schenectady, N. Y.
Alco Valve Co., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
American Meter Co., Inc., Philadelphia, Pa.
Andale Co., Philadelphia, Pa.
Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Binks Mfg. Co., Chicago, Ill.
CCA Products, Inc., Glendale, Calif.
Commercial Filters Corp., Melrose, Mass.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Cuno Engineering Corp., Meriden, Conn.
Danielson Mfg. Co., Danielson, Conn.
DeVilbiss Co., The, Toledo, O.
Dollinger Corp., Rochester, N. Y.
Eddington Metal Specialty Co., Eddington, Pa.
Emco Pneumatic Corp., Des Moines, Ia.
Filtrine Mfg. Co., Inc., Waldwick, N. J.
Fisher Governor Co., Marshalltown, Ia.
Fram Corp., Providence, R. I.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Filters, Inc., Novi, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kraissl Co., Inc., The, Hackensack, N. J.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Marvel Engineering Co., Chicago, Ill.
McIntire Co., The, Livingston, N. J.
Micro Metallic Corp., Glen Cove, N. Y.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Newark Wire Cloth Co., Newark, N. J.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., South Norwalk, Conn.
Porous Plastic Filter Co., Glen Cove, N. Y.
Scientific Instrument Co., Detroit, Mich.
Selas Corp. of America, Dresher, Pa.
Sethco Mfg. Co., Merrick, N. Y.
Standard Machine & Mfg. Co., St. Louis, Mo.
Trerice Co., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
Unifilter Co., Novi, Mich.
Warner Lewis Co., Div. of Fram Corp., Tulsa, Okla.
Watts Regulator Co., Lawrence, Mass.
Winslow Engineering & Mfg. Co., Oakland, Calif.
Worthington Corp., East Orange, N. J.

FILTERS, REFRIGERANT

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Products, Inc., Schenectady, N. Y.
Alco Valve Co., St. Louis, Mo.
Commercial Filters Corp., Melrose, Mass.
Cuno Engineering Corp., Meriden, Conn.
Dollinger Corp., Rochester, N. Y.
Hannifin Corp., DesPlaines, Ill.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
McIntire Co., The, Livingston, N. J.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Mueller Brass Co., Port Huron, Mich.
Newark Wire Cloth Co., Newark, N. J.
Phillips & Co., H. A., Chicago, Ill.
Porous Plastic Filter Co., Glen Cove, N. Y.
Refrigeration Research, Inc., Brighton, Mich.
Remco, Inc., Zelienople, Pa.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Standard Machine & Mfg. Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Corp., Chicago, Ill.

FILTERS, WATER

Adams Co., Inc., R. P., Buffalo, N. Y.
Alco Products, Inc., Schenectady, N. Y.
Alco Valve Co., St. Louis, Mo.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Andale Co., Philadelphia, Pa.
Aquatrol Ferr-X Corp., Clifton, N. J.
Aquatrol Laboratories, Inc., Clifton, N. J.
Austin Engineering & Mfg. Co., Inc., Yaleta (El Paso County) Texas
Barnebey-Cheney Co., Columbus, O.
Belco Industrial Equipment Div., Bogue Electric Mfg. Co., Paterson, N. J.
Bruner Corp., Milwaukee, Wis.
Cochrane Corp., Philadelphia, Pa.
Commercial Filters Corp., Melrose, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Cuno Engineering Corp., Meriden, Conn.
Dearborn Chemical Co., Chicago, Ill.
Dollinger Corp., Rochester. N. Y.
Duriron Co., Inc., The, Dayton, O.
Duro Co., Dayton, O.
Eddington Metal Specialty Co., Eddington, Pa.
Elgin Softener Corp., Elgin, Ill.
Filtrine Mfg. Co., Inc., Waldwick, N. J.
Fram Corp., Providence, R. I.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Greer Hydraulics, Inc., Jamaica, N. Y.
Henry Valve Co., Melrose Park, Ill.
Hilliard Corp., Elmira, N.Y.
Hungerford & Terry, Inc., Clayton, N. J.
Illinois Water Treatment Co., Rockford, Ill.
Industrial Filter & Pump Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Kisco Boiler & Engineering Co., St. Louis.
Layne & Bowler, Inc., Memphis, Tenn.
Marvel Engineering Co., Chicago, Ill.
McIntire Co., The, Livingston, N. J.
Micro Metallic Corp., Glen Cove, N. Y.
Modern Div., George Getz Corp., Rockford, Ill.
Mueller Brass Co., Port Huron, Mich.
Newark Wire Cloth Co., Newark, N. J.
Norwood Associated Engineers Inc., Springfield, Mass.
Oshkosh Filter & Softener Co., Oshkosh, Wis.
Pace Inc., R.M., Indianapolis, Ind.
Permutit Co., New York, N. Y.
Porous Plastic Filter Co., Glen Cove, N. Y.
Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Red Jacket Mfg. Co., Davenport, Ia.
Reynolds Water Conditioning Co., Detroit, Mich.
Richmond Engineering Co., Richmond, Va.
Selas Corp. of America, Dresher, Pa.
Skinner Div., Bendix Aviation Corp., Green Island, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Sparkler Mfg. Co., Mundelein, Ill.
Stover Water Softener Co., St. Charles, Ill.
Tryco Products, Inc., Westfield, Mass.
Uniflow Mfg. Co., Erie, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Winslow Engineering & Mfg. Co., Oakland, Calif.
Worthington Corp., East Orange, N. J.

FINNED TUBING

See Tubing, Finned

FIRE EXTINGUISHING SYSTEMS

See Systems, Fire Extinguishing

FIRE PUMPS

See Pumps, Fire

FIRE VALVES AND VENTILATORS

See Ventilators, Roof, with Fusible Links

FITTINGS, ALUMINUM TUBE

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
Crawford Fitting Co., Cleveland, O.
Flodar Corp., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Swepco Tube Corp., Clifton, N. J.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.

FITTINGS, BLOW PIPE

Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blow Pipe Co., Chicago, Ill. (tapers, tees, elbows, etc.)
Carolina Blower Co., Inc., Greensboro, N. C.
Chicago Metal Mfg. Co., Chicago, Ill.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Inc., Alfred, Milwaukee, Wis.
Griffin & Co., Louisville, Ky.
Kice Metal Products Co., Wichita, Kans.
Kirk & Blum Mfg. Co., Cincinnati, O.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Vacuum Supply Co., Chicago, Ill.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Schmieg Industries, Inc., Detroit, Mich.
Torit Mfg. Co., St. Paul, Minn.
United Sheet Metal Co., Inc., Columbus, O.
United States Register Co., Battle Creek, Mich.
Wer-Coy Fabrication Co., Detroit, Mich.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

FITTINGS AND BUSHINGS, FUEL OIL TANK; ALARMS, LIQUID LEVEL

Barclay, Inc., Robert, Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
OPW Corp., Cincinnati, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Span Brass Mfg. Co., Otsego, Mich.
U. S. Plug & Fitting Co., Wellington, O.

FITTINGS FOR CENTRAL VACUUM CLEANING SYSTEMS

H-P Products, Inc., Louisville, O.
Pullman Vacuum Cleaner Co., Boston, Mass.
Spencer Turbine Co., Hartford, Conn.

FITTINGS, COPPER TUBE, COMPRESSION

Acheson Mfg. Co., Rankin, Pa.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
American Brass Co., Waterbury, Conn.
American Sanitary Mfg. Co., Abingdon, Ill.
Baker & Co., R. H., Los Angeles, Calif.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Forging and Mfg. Co., Chicago, Ill.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Flodar Corp., Cleveland, O.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Madden Brass Products Co., Aurora, Ill.
Mueller Brass Co., Port Huron, Mich.
Sall Bros. Co., Rockford, Ill.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Span Brass Mfg. Co., Otsego, Mich.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Wabash Corp., Chicago, Ill.
Weatherhead Co., Ft. Wayne Div., Ft. Wayne, Ind.

FITTINGS, COPPER TUBE, FLARED

Acheson Mfg. Co., Rankin, Pa.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Flodar Corp., Cleveland, O.
Gardiner Metal Co., Chicago, Ill.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Madden Brass Products Co., Aurora, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Mueller Co., Decatur, Ill.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Span Brass Mfg. Co., Otsego, Mich.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Weatherhead Co., Ft. Wayne Div., Ft. Wayne, Ind.

FITTINGS, COPPER TUBE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
American Sanitary Mfg. Co., Abingdon, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Gardiner Metal Co., Chicago, Ill.
General Fittings Co., East Greenwich, R. I.
Gerry Tool Co., The, Bristol, Conn.
Grabler Mfg. Co., Cleveland, O.
Hammond Brass Works, Hammond, Ind.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Span Brass Mfg. Co., Otsego, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Union Metal Works Co., Inc., Chelsea, Mass.
Walworth Co., New York, N. Y. (silver brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Crane Co., Chicago, Ill.

FITTINGS, EXHAUST, GARAGE, FOR ATTACHING CAR EXHAUST PIPE

American Metal Hose Div., The American Brass Co., Waterbury, Conn.
Ammerman Co., Inc., Minneapolis, Minn.
Kent-Moore Organization, Inc., Warren, Mich.
Wendt Co., O. A., Chicago, Ill.

FITTINGS, HOSE TO PIPE

Acheson Mfg. Co., Rankin, Pa.
Aeroquip Corp., Jackson, Mich.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
Allen Mfg. Co., W. D., Chicago, Ill.
American Sanitary Mfg. Co., Abingdon, Ill. (for polyethylene plastic tubing)
Anchor Coupling Co., Libertyville, Ill.
Binks Mfg. Co., Chicago, Ill.
Boston Woven Hose & Rubber Co., Div of American Biltrite Rubber Co., Cambridge, Mass.
Dole Refrigerating Co., Chicago, Ill.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O.
Hewitt-Robins, Inc., Stamford, Conn.
Jaco Mfg. Co., Cleveland, O. (nylon compression tube fitting)
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
LE-HI Div., Hose Accessories Co., Philadelphia, Pa.
Mic-Lin Co., Maple Shade, N. J.
Quick Joint Div., Automatic Bending Co., Harvey, Ill. (for polyethylene plastic tubing)
Sawhill Tubular Products, Inc., Sharon, Pa.
Span Brass Mfg. Co., Otsego, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
United States Rubber Co., New York, N. Y.
Weatherhead Co., Ft. Wayne Div., Ft. Wayne, Ind.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

American Tube Products, Inc., West Warwick, R. I.
Autostributor Co., Lansing, Mich. (manifold for connecting radiator branches)
Bell & Gossett Co., Morton Grove, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Hi-Flow Products, Inc., Copiague, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kehm Corp., The, Chicago, Ill.
Mel Products Co., The, New Haven, Conn.
Sall Bros. Co., Rockford, Ill.
Span Brass Mfg. Co., Otsego, Mich.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.

FITTINGS, LIFT

Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Webster & Co., Warren, Camden, N. J.

FITTINGS, LINED

American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Rubber)
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Barrows Porcelain Enamel Corp., Cincinnati, O. (glass, ceramic coated)
Bart Mfg. Corp., Belleville, N. J.
Cement Lined Pipe Co., Lynn, Mass. (Lead and tin)
Chemical Coatings & Engineering Co., Edgemont, Pa.
Division Lead Co., Summit, Ill.
Gates Engineering Co., Wilmington, Del.
General Ceramics Corp., Keasbey, N. J. (ceramics & graphite)
Goodrich Industrial Products Co., B. F., Akron, O.
Heil Process Equipment Corp., Cleveland, O.
Knapp Mills, Inc., Long Island City, N. Y.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Luzerne Rubber Co., Trenton, N. J. (hard rubber)
Marquette Coppersmithing Co., Philadelphia, Pa.
Michigan Pipe Co., Gagetown, Mich. (Wood, saran rubber)
National Lead Co., New York, N. Y. (Lead)
Nibco, Inc., Elkhart, Ind. (Tinned)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (lead)
Saran Lined Pipe Co., Ferndale, Mich. (saran lined)
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., New York, N. Y. (cement)
United States Rubber Co., New York, N. Y. (Rubber)

FITTINGS, PIPE, ALUMINUM

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
Aluminum Co. of America, Pittsburgh, Pa.
American Flow Control Corp., Houston, Tex.
Chemiquip Co., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Ladish Co., Cudahy, Wis.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Robinson Corp., Somerville, N. J.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky. (welding)
Victaulic Co. of America, Elizabeth, N. J.
Welding Fittings Corp., New Castle, Pa.
Youngstown Welding & Engineering Co., Youngstown, O.

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
Aeroquip, Inc., Van Wert, O.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
American Manganese Bronze Co., Philadelphia, Pa.
American Sanitary Mfg. Co., Abingdon, Ill.
Anchor Coupling Co., Libertyville, Ill.
Anderson Brass Co., Detroit, Mich.
Anderson Metals Corp., Kansas City, Mo.
Baker & Co., R. H., Los Angeles, Calif.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flodar Corp., Cleveland, O.
Gilbert Brass Foundry Co., St. Louis, Mo.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Imperial Brass Mfg. Co., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Ken-Ray Brass Products, Inc., Vermont, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Leavitt Machine Co., Orange, Mass.
Madden Brass Products Co., Aurora, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Mueller Brass Co., Port Huron, Mich.
New York Brass Fdry., New York, N. Y.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Span Brass Mfg. Co., Otsego, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Union Metal Works Co., Inc., Chelsea, Mass.
Walworth Co., New York, N. Y. (Brazed)
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.

FITTINGS, PIPE, BRASS, WELDING

Airaterra (Roylyn Products), Glendale, Calif.
Chase Brass & Copper Co., Waterbury, Conn.
Ladish Co., Cudahy, Wis.

Midwest Piping Co., Inc., St. Louis, Mo.
Robinson Corp., Somerville, N. J.
Span Brass Mfg. Co., Otsego, Mich.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.

FITTINGS, PIPE, BRONZE, BRAZED

Acheson Mfg. Co., Rankin, Pa.
Bonney Forge & Tool Works, Allentown, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Union Metal Works Co., Inc., Chelsea, Mass.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRONZE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., East Greenwich, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Hi-Flow Products, Inc., Copiague, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Union Metal Works Co., Inc., Chelsea, Mass.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Duriron Co., Inc., The, Dayton, O. (Acid resisting)
Frick Co., Waynesboro, Pa.
Goodall Rubber Co., Trenton, N. J.
Grinnell Co., Inc., Providence, R. I.
Kuhns Bros. Co., Dayton, O.
Leavitt Machine Co., Orange, Mass.
Lynchburg Foundry Co., Lynchburg, Va.
M & H Valve & Fittings Co., Div. of Walworth Co., Anniston, Ala.
Malleable Iron Fittings Co., Branford, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Parks-Cramer Co., Fitchburg Mass. (Jacketed)
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
United States Pipe & Foundry Co., Birmingham, Ala.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, CAST IRON, THREADED

Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Kuhns Bros. Co., Dayton, O.
Leavitt Machine Co., Orange, Mass.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Plug & Fitting Co., Wellington, O. (pipe plug)
Union Malleable Mfg. Co., Ashland, O.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

FITTINGS, PIPE, COMPRESSION

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Baker & Co., R. H., Los Angeles, Calif.
Cooper Alloy Corp., Hillside, N. J.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hays Mfg. Co., Erie, Pa.
Quick Joint Div., Automatic Bending Co., Harvey, Ill.
Telsco Fittings Div., Dallas, Tex.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

FITTINGS, PIPE, HARD RUBBER

American Flow Control Corp., Houston, Tex.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Gates Engineering Co., Wilmington, Del.
Goodrich Industrial Products Co., B. F., Akron, O.
Luzerne Rubber Co, Trenton, N. J.
United States Rubber Co., New York, N. Y.
Vanton Pump & Equipment Corp., Hillside, N. J.

FITTINGS, PIPE, JACKETED

Albert Pipe Supply Co., Brooklyn, N. Y.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Hetherington & Berner, Inc., Indianapolis, Ind.
Parks-Cramer Co., Fitchburg, Mass.
Red Jacket Co., Inc., Carnegie, Pa.
Youngstown Welding & Engineering Co., Youngstown, O.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Jersey City, N. J.
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Anchor Metal Co., Inc., Brooklyn, N. Y.
Bunker Hill Co., The, Sales & Fabrication Div., Seattle, Wash.
Division Lead Co., Summit, Ill.
Flemm Lead Co., Inc., Long Island City, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Knapp Mills, Inc., Long Island City, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Leavitt Machine Co., Orange, Mass.
Mueller Co., Decatur, Ill.
National Lead Co., New York, N. Y.
Resisto Pipe & Valve Co., East Cambridge, Mass.
Rochester Lead Works, Inc., Rochester, N. Y.

FITTINGS, PIPE, MALLEABLE

Corley Co., Inc., The, New York, N. Y.
Crane Co., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Fanner Mfg. Co., The, Cleveland, O.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
James Mfg. Co., Ft. Atkinson, Wis.
Malleable Iron Fittings Co., Branford, Conn.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Stockham Valves & Fittings, Birmingham, Ala.
Telesco Fittings Div., Dallas, Tex.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Union Malleable Mfg. Co., Ashland, O.
Union Pipe Fitting Co., Fort Atkinson, Wis.
Vitaulic Co. of America, Elizabeth, N. J.
Walworth Co., New York, N. Y.
Ward Foundries, Inc. J. P., **Blossburgh, Pa.**

FITTINGS, PIPE, MALLEABLE, BRAZED

Flagg & Co., Inc., Stanley G., Philadelphia, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

American Manganese Bronze Co., Philadelphia, Pa.
Bart Mfg. Corp., Belleville, N. J.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Robinson Corp., Somerville, N. J.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky. (welding)
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.
Youngstown Welding & Engineering Co., Youngstown, O.

FITTINGS, PIPE, NICKEL PLATED

Acheson Mfg. Co., Rankin, Pa.
Bart Mfg. Corp., Belleville, N. J.
Quick Joint Div., Automatic Bending Co., Harvey, Ill.
Taylor Forge & Pipe Wks., Chicago, Ill.

FITTINGS, PIPE, PLASTIC

Albert Pipe Supply Co., Brooklyn, N. Y.
Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Agile Corp., Bedford, O.
American Flow Control Corp., Houston, Tex.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Anesite Co., Chicago, Ill.
Associated Plastic Co's., Inc., Midland, Mich. (rigid polyvinyl)
Atlas Mineral Products Co., Mertztown, Pa.
Bolta Products, A Div. of General Tire & Rubber Co., Lawrence, Mass.
Capitol Mfg. & Supply Co., Columbus, O.
Carlon Products Corp., Cleveland, O.
Chesflex Corp., Yonkers, N. Y.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O.
Commercial Plastics Co., Chicago, Ill.
Continental Can Co., Millsplastic Pipe Div., New York, N. Y.
Crane Co., Chicago, Ill.
Crescent Plastics, Inc., Evansville, Ind.
Danielson Mfg. Co., Danielson, Conn.
Easton Plastic Products Co., Inc., Easton, Pa. (rigid unplasticized polyvinyl chloride)
Evanite Plastic Co., Div. of the Evans Pipe Co., Uhrichsville, O.
Franklin Plastics, Inc., Franklin, Pa.
General Ceramics Corp., Keasbey, N.J.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O. (PVC)
Grinnell Co., Inc., Providence, R. I.
Hartwell & Son, Inc., H. N., Boston, Mass. (PVC)
Haveg Industries, Inc., Newark, Del.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Industrial Plastic Fittings Co., Cleveland, O.
Jaco Mfg. Co., Cleveland, O. (nylon compression tube fitting)
Johnson Plastics Corp., Chagrin Falls, O.
Kraloy Plastic Pipe Co., Inc., Los Angeles, Calif.
Luzerne Rubber Co., Trenton, N. J.
Manufacturers Corp., Mansfield, O.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Moore & Co., Samuel, Mantua, O. (tubing)
Mueller Brass Co., Port Huron, Mich.
Nelson Foundry Co., Morton Grove, Ill.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Plastex Corp., Columbus, O.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Protokap, Inc., Houston, Tex. (end caps)
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Reflin Co., **San Diego, Calif. (rigid, reinforced with glass fibers)**
Republic Steel Corp., Cleveland, O.
Robinson Clay Product Co., The, Akron, O.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
S & C Mfg. Co., Cincinnati, O.
Saran Lined Pipe Co., Ferndale, Mich. (saran)
Seelye Craftsmen, The, Minneapolis, Minn.
Skyline Industries Sales, Inc., Titusville, Pa.
Sloane Mfg. Co., Sun Valley, Calif. (PVC, kralastic, butyrate)
Southwestern Plastic Pipe Co., Mineral Wells, Tex.
Stokes Molded Products, Div. of The Electric Storage Battery Co., Trenton, N. J. (unplasticized polyvinyl chloride)

Texas Vitrified Pipe Co., Mineral Wells, Tex.
Tube Turns Plastics, Inc., Louisville, Ky. (injection molded PVC, and others)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Vanton Pump & Equipment Corp., Hillside, N. J.
Walworth Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, SADDLE TEE

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Baker & Co., R. H., Los Angeles, Calif.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Ladish Co., Cudahy, Wis.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Sall Bros. Co., Rockford, Ill.
Skinner Co., M. B., South Bend, Ind.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky. (welding)

FITTINGS, PIPE, SANITARY

Acheson Mfg. Co., Rankin, Pa.
Central Foundry Co., Newark, N. J.
Duriron Co., Inc., The, Dayton, O. (corrosion resisting)
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Leavitt Machine Co., Orange, Mass.
Mueller Brass Co., Port Huron, Mich.
Robinson Clay Product Co., The, Akron, O.
Somerville Iron Works, Inc., Chattanooga, Tenn.
Stockham Valves & Fittings, Birmingham, Ala.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Works Co., Inc., Chelsea, Mass.

FITTINGS, PIPE, SPECIAL FOR BASEBOARD RADIATION

General Fittings Co., East Greenwich, R. I.
Hi-Flow Products, Inc., Copiague, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Rittling Corp., The, Buffalo, N. Y.
Union Metal Works Co., Inc., Chelsea, Mass.
Webster & Co., Warren, Camden, N. J.

FITTINGS, PIPE, STAINLESS STEEL

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Allmetal Screw Products Co., Inc., Garden City, Long Island, N. Y.
Alloy Stainless Products Co., Totowa, N. J.
Alloy Steel Products Co., Linden, N. J.
American Flow Control Corp., Houston, Tex.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Baker & Co., R. H., Los Angeles, Calif.
Bonney Forge & Tool Wks., Allentown, Pa.
Camco Products Inc., North Haven, Conn.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Fabri-Valve Co. of America, Portland, Ore.
Flodar Corp., Cleveland, O.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Ladish Co., Cudahy, Wis.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Pypon Co., Pittsburgh, Pa.
Robinson Corp., Somerville, N. J.
Speedline Stainless Steel Fittings Div., Horace T. Potts Co., Philadelphia, Pa.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Wall Tube & Metal Products Co., Newport, Tenn.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.
Youngstown Welding & Engineering Co., Youngstown, O.

FITTINGS, PIPE, STAINLESS STEEL, WELDING

Alloy Steel Products Co., Linden, N. J.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bonney Forge & Tool Wks., Allentown, Pa.
Camco Products, Inc., North Haven, Conn.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Fabri-Valve Co. of America, Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Heat & Power Corp., Baltimore, Md.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Robinson Corp., Somerville, N. J.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Speedline Stainless Steel Fittings Div., Horace T. Potts Co., Philadelphia, Pa.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.
Youngstown Welding & Engineering Co., Youngstown, O.

FITTINGS, PIPE, STEEL, FLANGED

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Frick Co., Waynesboro, Pa.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pipe Line Development Co., Cleveland, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Semet-Solvay Engrg Div., Allied Chemical & Dye Corp., New York, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, FORGED, THREADED

Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Meter Co., Inc., Philadelphia, Pa.
Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Henry Valve Co., Melrose Park, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif. (pipe plug)
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, SOCKET WELD

Alpha Plastics, Inc., Livingston, N. J. (PVC)
Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Ladish Co., Cudahy, Wis.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, THREADED

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Flodar Corp., Cleveland, O.
Frick Co., Waynesboro, Pa.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Ladish Co., Cudahy, Wis.
Le Had Mfg. Corp., Buffalo, N. Y.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Sawhill Tubular Products, Inc., Sharon, Pa.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Tubing Seal-Cap, Inc., San Gabriel, Calif. (plugs and caps)
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Beaird Co., J. B., Shreveport, La.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Electric Steel Foundry Co., Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Heat & Power Corp., Baltimore, Md.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pipe Line Development Co., Cleveland, O.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Youngstown Welding & Engineering Co., Youngstown, O.

FITTINGS, PIPE, STEEL, WELDING, SEAMLESS

Babcock & Wilcox., Tubular Products Div., Beaver Falls, Pa.
Crane Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Ladish Co., Cudahy, Wis.
Nibco, Inc., Elkhart, Ind.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Special Screw Products, Bedford, O.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, WROUGHT IRON, WELDING

Albert Pipe Supply Co., Brooklyn, N. Y.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bonney Forge & Tool Works, Allentown, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Wash-

ington, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, REFRIGERATION

Aeroquip, Inc., Van Wert, O.
Aeroquip Corp., Western Div., Burbank, Calif.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Forging and Mfg. Co., Chicago, Ill.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Flodar Corp., Cleveland, O.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Madden Brass Products Co., Aurora, Ill.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Piper Tool Co., Detroit, Mich.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Span Brass Mfg. Co., Otsego, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

Aeroquip, Inc., Van Wert, O.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
Couplings Co., Chicago, Ill.
Flodar Corp., Cleveland, O.
H-P Products, Inc., Louisville, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Pipe Tool Co., Detroit; Mich.
Special Screw Products, Bedford, O.
Swepco Tube Corp., Clifton, N. J.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.

FITTINGS, STEEL TUBE, FLARELESS

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
American Flow Control Corp., Houston, Tex.
American Metal Hose Div., American Brass Co., The, Waterbury, Conn.
Chicago Forging and Mfg. Co., Chicago, Ill.
Crawford Fitting Co., Cleveland, O.
Flodar Corp., Cleveland, O.
H-P Products, Inc., Louisville, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Lenz Co., Dayton 1, O.
Swepco Tube Corp., Clifton, N. J.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Youngstown Welding & Engineering Co., Youngstown, O.

FLAME CONTROLS

See Controls, Flame Failure

FLAME CUTTERS

See Cutters, Flame

FLANGE BOLTS

See Bolts and Studs, Flange

FLANGE SEPARATORS

See Separators, Flange

FLANGES, ORIFICE

American Meter Co., Inc., Philadelphia, Pa.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Ladish Co., Cudahy, Wis.
Madden Corp., The, Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
New York Brass Foundry, New York, N. Y. (brass)
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Catasauqua, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Trimount Instrument Co., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Camco Products, Inc., North Haven, Conn.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Catasauqua, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Beaird Co., J. B., Shreveport, La.
Camco Products Inc., North Haven, Conn.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Catasauqua, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Star Stainless Screw Co., Paterson, N. J.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, ALLOY STEEL, WELDING

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Camco Products Inc., North Haven, Conn.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Phoenix Mfg. Co., Catasauqua, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Star Stainless Screw Co., Paterson, N. J.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, ALUMINUM, WELDING

Grinnell Co., Inc., Providence, R. I.
Ladish Co., Cudahy, Wis.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Providence, R. I.
Ladish Co., Cudahy, Wis.
National Valve & Mfg. Co., Pittsburgh, Pa.
New York Brass Foundry, New York, N. Y.
Nibco, Inc., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Ritter Pattern & Casting Co., New York, N. Y.
Span Brass Mfg. Co., Otsego, Mich.
Union Metal Works Co., Inc., Chelsea, Mass.
Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Fanner Mfg. Co., The, Cleveland, O.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
G. & H Mfg. Co., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
M & H Valve & Fittings Co., Div. of Walworth Co., Anniston, Ala.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Ritter Pattern & Casting Co., New York, N. Y.
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

Crane Co., Chicago, Ill.
Fanner Mfg. Co., The, Cleveland, O.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Jefferson Union Co., Lexington, Mass.
National Valve & Mfg. Co., Pittsburgh, Pa.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

Bart Mfg. Corp., Belleville, N. J.
Camco Products, Inc., North Haven, Conn.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Star Stainless Screw Co., Paterson, N. J.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, PLASTIC

Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O.
Easton Plastic Products Co., Inc., Easton, Pa. (rigid unplasticized polyvinyl chloride)
Sloane Mfg. Co., Sun Valley, Calif.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
Tube Turns Plastics, Inc., Louisville, Ky.
Vanton Pump & Equipment Corp., Hillside, N. J.

FLANGES, PIPE, STEEL, FORGED

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Camco Products, Inc., North Haven, Conn.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Phoenix Mfg. Co., Catasauqua, Pa.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Pennsylvania Forge Co., Philadelphia, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, LAP JOINT

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Camco Products, Inc., North Haven, Conn.
Crane Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Mfg. Co., Catasauqua, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Swepco Tube Corp., Clifton, N. J.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Welding Fitting Corp., New Castle, Pa.

FLANGES, PIPE, STEEL, SCREWED

Babcock & Wilcox Co., The, Tubular Products Div., Beaver Falls, Pa.
Beaird Co., J. B., Shreveport, La.
Camco Products, Inc., North Haven, Conn.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Mfg. Co., Catasauqua, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
U. S. Plug & Fitting Co., Wellington, O.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Camco Products, Inc., North Haven, Conn.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Co., Div. of Harsco Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Mfg. Co., Catasauqua, Pa.
Pipe Line Development Co., Cleveland, O.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLARED FITTINGS, COPPER TUBE

See Fittings, Copper, Tube, Flared

FLARED FITTINGS, STEEL TUBE

See Fittings, Steel Tube, Flared

FLARING TOOLS FOR TUBING

See Tools, Flaring

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE DUCT CONNECTIONS

See Connections, Duct, Flexible

FLEXIBLE DUCTS

See Ducts and Duct Fittings, Prefabricated, Flexible, Metallic and Non-Metallic

FLEXIBLE METAL HOSE

See Hose, Flexible, Metal and Fittings

FLOAT SWITCHES

See Switches, Float

FLOAT VALVES

See Valves, Float

FLOATS, STEAM TRAP, ETC.

Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Chicago Float Works, Not Inc., Chicago, Ill.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Crane Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Harris & Co., Arthur, Chicago, Ill. (all metals)
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kieley & Mueller, Inc., Middletown, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Owens & Co., Inc., Henry, Cranston, R. I.
Reichert Float & Mfg. Co., Toledo, O.
Sarco Co., Inc., New York, N. Y.
Sterling Engineering Mfg. Corp., Hyde Park, Mass.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., Inc., The, Pittsburgh, Pa.

FLOOR AND CEILING PLATES

See Plates, Floor and Ceiling

FLOW ALARMS

See Alarms, High and Low Flow for Piping Systems

FLOW CONTROL VALVES

See Valves, Flow Control

FLOW MEASURING NOZZLES AND TUBES

See Nozzles, Flow Measuring

FLOW METERS

See Meters, Flow

FLOW SWITCHES

See Switches, Flow

FLOW TRANSMITTERS

See Transmitters, Flow

FORGED STEEL VALVES

See Valves, Forged Steel

FRAMES, AIR INLET, PREFABRICATED, FOR AIR CONDITIONING UNITS

Lewis Mfg. Co., Inc., Miami, Fla.

FRESHENERS, AIR

See Adsorbers, Odor; Compounds, Air Freshening

FUEL ECONOMIZERS

See Economizers, Fuel

FUEL OIL LEAK DETECTORS

See Detectors, Leak, Fuel Oil

FUEL OIL UNITS

See Units, Fuel Oil

FUEL UNIT TESTERS

See Testers, Fuel Unit

FURNACES, DUCT

See Heaters, Duct

FURNACES, SUSPENDED

See Heaters, Air, Direct Fired

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING CENTRAL HEATING

(Exclusively for duct distribution of air—300,000 Btu per hr and over) For direct fired heaters, which may be located in the space heated or may be used in central plant installations with duct distribution of the air, see the listings under Heaters, Air, Direct Fired.

Air Conditioning Engineering Co., Cambridge, Mass.

Aladdin Heating Corp., San Leandro, Calif.
American Foundry & Furnace Co., Bloomington, Ill.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O.
Auburn Foundry, Inc., Heating Div., Auburn, Ind.
Bard Mfg. Co., Bryan, O.
Besser Furnace and Air Conditioning Corp., Charlotte, N. C.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Century Engineering Corp., Cedar Rapids, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Cox Mfg. Co., Ridgeville, Ind.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Inland Heater Corp., Minneapolis, Minn.
International Heater Co., Utica, N. Y.
Jackson & Church Co., Saginaw, Mich.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, O.
Johnson Heater Corp., Chelsea, Mass.
Lee Corporation, Wilmington, Del.
Lennox Industries Inc., Des Moines, Ia.
Lennox Industries Inc., Columbus, O.
Lennox Industries Inc., Marshalltown, Ia.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mammoth Furnace Co., Minneapolis, Minn.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National Heater Co., Inc., St. Paul Minn.
National-U. S. Radiator Corp., Johnstown, Pa.
Norwalk Air Conditioning Corp., S. Norwalk, Conn.
Patten Co., J. V., Sycamore, Ill.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Ray Oil Burner Co., San Francisco, Calif.
Reznor Mfg. Co., Mercer, Pa.
Rosebraugh Co., W. W., Salem, Ore.
Round Oak Co., Inc., Dowagiac, Mich.
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Surface Combustion Corp., Toledo, O.
Syncromatic Corp., Watertown, Wis.
Tjernlund Mfg. Co., St. Paul, Minn.
Tuck-Aire Furnace Co., San Francisco, Calif.
Waterman-Waterbury Co., The, Minneapolis, Minn.
York-Shipley, Inc., York, Pa.

FUSIBLE LINKS

See Links, Fusible

GAGE GLASSES

See Glasses, Gage

GAGE SETS, REFRIGERATION

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Defender Instrument & Regulator Co., Boody, Ill.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kent-Moore Organization, Inc., Warren, Mich.
Shank Co., Cyrus, Chicago, Ill.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.

GAGE TESTERS

See Testers, Gage, Dead Weight

GAGES, AIR FILTER

Bacharach Industrial Instrument Co., Pittsburgh, Pa. (filter gauge)
Cleveland Controls, Inc., Cleveland, O.
Defender Instrument and Regulator Co., Boody, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Hays Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Meriam Instrument Co., The, Cleveland, O.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Canton Stoker Corp., Canton, O.
Cleveland Controls, Inc., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Defender Instrument and Regulator Co., Boody, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
General Controls Co., Glendale, Calif.
Hays Corp., Michigan City, Ind.
Hill & Co., E. Vernon, Lake Geneva, Wis.
King Engineering Corp., Ann Arbor, Mich.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Markesan, Wis.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bate Soot Blower Div., General Blower Co., Inc., Philadelphia, Pa.
Binks Mfg. Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Canton Stoker Corp., Canton, O.
Cleveland Controls, Inc., Cleveland, O.
Crosby Valve & Gage Co., Wrentham, Mass.
Defender Instrument and Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Dillon & Co., Inc., W. C., Van Nuys, Calif. (mechanical)
Dunham-Bush, Inc., West Hartford, Conn.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Gardner-Denver Co., Quincy, Ill.
General Controls Co., Glendale, Calif.
Hastings-Raydist, Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Imperial Brass Mfg. Co., Chicago, Ill.
Longergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
New York Air Valve Corp., Brooklyn, N. Y.
Norden-Ketay Corp., Instrument & Systems Div., Milford, Conn.
Norwalk Valve Co., South Norwalk, Conn.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia. Pa.
Research Vacuum Supply Co., Chicago, Ill.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Markesan, Wis.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Wallace & Tiernan Inc., Belleville, N. J.
Weksler Thermometer Corp., Freeport, N. Y.

GAGES, INDICATING, VACUUM

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Cleveland Controls, Inc., Cleveland, O.
Crosby Valve & Gage Co., Wrentham, Mass.
Defender Instrument and Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Dole Valve Co., The, Morton Grove, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hastings-Raydist, Inc., Hampton, Va.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Imperial Brass Mfg. Co., Chicago, Ill.
Longergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
New York Air Valve Corp., Brooklyn, N. Y.
Norden-Ketay Corp., Instrument and Systems Div., Milford, Conn.
Norwalk Valve Co., South Norwalk, Conn.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Research Vacuum Supply Co., Chicago, Ill.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Wallace & Tiernan Inc., Belleville, N. J.
Weksler Thermometer Corp., Freeport, N. Y.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Defender Instrument and Regulator Co., Boody, Ill.
Diamond Power Specialty Corp., Lancaster, O.
Ernst Water Column & Gauge Co., Livingston, N. J.
Fine Products Co., Berwyn, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
General Controls Co., Glendale, Calif.
Hays Corp., Michigan City, Ind.
Henry Valve Co., Melrose Park. Ill.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Keckley Co., O. C., Skokie, Ill.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidometer Corp., Long Island City, N. Y.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Mar-Coil Heater Co., Union, N. J.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
New York Air Valve Corp., Brooklyn, N. Y.
Norden-Ketay Corp.,- Instrument and Systems Div., Milford, Conn.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Oil Equipment Mfg. Corp., New Haven, Conn.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.

Petrometer Corp., Long Island City, N. Y.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Phillips & Co., H. A., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Republic Mfg. Co., Cleveland, O.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Simplex Valve & Meter Co., Lancaster, Pa.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Strahman Valves, Inc., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Wallace & Tiernan Inc., Belleville, N. J.
Williams Gauge Co., Inc., The, Pittsburgh, Pa. (water)
Yarnall-Waring Co., Philadelphia, Pa.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

GAGES, OIL BURNER ELECTRODES

Scully Signal Co., Melrose, Mass.

GAGES, OIL TANK

Applied Mechanics Co., Boston, Mass.
Boston Machine Works Co., Lynn, Mass.
Defender Instrument & Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidometer Corp., Long Island City, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mar-Coil Heater Co., Union, N. J.
Oil Equipment Mfg. Corp., New Haven, Conn.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Petrometer Corp., Long Island City, N. Y.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scully Signal Co., Melrose, Mass.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Viking Pump Co., Cedar Falls, Ia.

GAGES, PIPE

A.C.M.I. Borescope Div., American Cystoscope Makers, Inc., Pelham Manor, N. Y. (internal borescope)
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Defender Instrument & Regulator Co., Boody, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Threadwell Tap & Die Co., Greenfield, Mass.
Three Point Industries, Evanston, Ill.

GALVANIZED SHEETS

See Sheets, Steel, Galvanized

GALVANNEALED SHEETS

See Sheets, Steel, Galvannealed

GARAGE VENTILATION FITTINGS

See Fittings, Exhaust, Garage, for Attaching Car Exhaust Pipe

GAS BURNERS

See Burners, Gas

GAS ENGINES

See Engines, Gas

GAS FIRED RADIATORS

See Radiators, Gas Fired

GAS PRESSURE REGULATORS

See Regulators, Pressure, Gas

GAS VENT AND FLUE PIPE

See Pipe and Fittings, Gas Vent and Flue

GAS VOLUME METERS

See Meters, Volume, Air and Gas

GASKETS

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O.
Alpha Metals, Inc., Jersey City, N. J.
American Felt Co., Glenville, Conn.
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
Armstrong Cork Co., Lancaster, Pa. (Cork & cork composition)
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Brady Co., W. H., Milwaukee, Wis.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chase Brass & Copper Co., Waterbury, Conn. (Brass and copper)
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, Inc., James B., Chicago, Ill.
Continental-Diamond Fibre Corp., Newark, Del.
Continental Rubber Wks., Erie, Pa.
Crane Co., Chicago, Ill.
Crane Packing Co., Morton Grove, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Durable Rubber Products, Chicago, Ill. (rubber)
Ernst Water Column & Gauge Co., Livingston, N. J.
Excelsior Leather Washer Mfg. Co., Rockford, Ill. (leather)
Felt Products Mfg. Co., Chicago, Ill.
Felters Company, The, Boston, Mass. (felt)
Flexitallic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Kent, O.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O. (rubber)
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson, Inc., Chicago, Ill. (asbestos)
Graton & Knight Co., Inc., Worcester, Mass. (Leather)
Greene, Tweed & Co., North Wales, Pa.
Hewitt-Robins, Inc., Stamford, Conn.
Houghton & Co., E. F., Philadelphia, Pa.
Johns-Manville, New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
McCord Corp., Detroit, Mich.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mic-Lin Co., Maple Shade, N. J.
Mortell Co., J. W., Kankakee, Ill.
National Lead Co., New York, N. Y. (lead)
Neff-Perkins Co., Cleveland, O.
New York Belting & Packing Co., Passaic, N. J.
Nicolet Industries, Inc., Hamilton, O. (asbestos)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber and asbestos)
Rhopac, Inc., Skokie, Ill. (all types — non metallic)
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubber Products Div., Parker-Hannifin Corp., Cleveland, O.
Saran Lined Pipe Co., Ferndale, Mich.
Schieren Co., Chas. A., Camden, N. J.
Sponge Products Div., B. F. Goodrich Co., Shelton, Conn.
Spring Packing Corp., Chicago, Ill. (adhesive-backed sponge rubber, cork & felt)
Stalwart Rubber Co., The, Bedford, O. (rubber)
Stokes Molded Products, Div. of The Electric Storage Battery Co., Trenton, N. J. (Hard rubber)
Strahman Valves, Inc., New York, N. Y.
Technical Ply-Wood Sales, Chicago, Ill.
Thermoid Co., Trenton, N. J.
Tube Turns Plastics, Inc., Louisville, Ky. (for PVC pipe)
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O. (plastic)
Western Felt Wks., Chicago, Ill. (Felt)
Wolfe Co., Franklin C., Culver City, Calif.
Zimmerman Packing Co., Cincinnati, O. (also gasket cutters)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GAS VENT AND FLUE PIPE AND FITTINGS

See Pipe and Fittings, Gas Vent and Flue

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Berger Bros., Co., Philadelphia, Pa.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Goethel Sheet Metal Works, Inc., Alfred, Milwaukee, Wis.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Kirk & Blum Mfg. Co., Cincinnati, O.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Rockwell Co., W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Spencer Turbine Co., Hartford, Conn.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GATES, LIFT, FOR TRUCKS

Anthony Company, Streator, Ill.

GEAR-MOTORS

Abart Gear & Machine Co., Chicago, Ill.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, The, Milwaukee, Wis.
Boston Gear Works, Quincy, Mass.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Century Electric Co., St. Louis, Mo.
Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich.
Doerr Electric Corp., Cedarburg, Wis.
Electro-Dynamic Div. of General Dynamics Corp., Bayonne, N. J.
Elliott Co., Jeannette, Pa.
Falk Corp., Milwaukee, Wis.
Galloway Co., G. W., Cooling Tower Div., Arcadia, Calif. (for cooling tower drives)
Howard Industries, Inc., Racine, Wis.
Howell Electric Motors Co., Howell, Mich.
Janette Elect. Mfg. Co., Morton Grove, Ill.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich. (hydraulic)
Lamb Electric Co., A Div. of American Machine & Metals, Inc., Kent, O.
Lima Electric Motor Co., Inc., The, Lima, O.
Link-Belt Co., Chicago, Ill.
Master Electric Co., Dayton, O.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Smith Corp., A. O., Milwaukee, Wis.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U.S. Electrical Motors, Inc., Los Angeles, Calif.

GENERATORS, ELECTRIC PORTABLE, ENGINE DRIVEN

(specifically designed for supplying power to power tools)

Howard Industries, Inc., Racine, Wis.
Thor Power Tool Co., Chicago, Ill.

GENERATORS, STEAM, ELECTRIC (Electrically "Fired" Boilers)

Custom Engrg. Co., Los Angeles, Calif.
Hill Diesel Engine Corp., Lansing, Mich.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Precision Parts Corp., Nashville, Tenn.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE
See Pipe, Glass

GLASSES, GAGE
Associated Valve & Engineering Co., Chicago, Ill.
Chesterton Co., A. W., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Corning Glass Works, Corning, N. Y.
Defender Instrument & Regulator Co., Boody, Ill.
Diamond Power Specialty Corp., Lancaster, O.
Ernst Water Column & Gauge Co., Livingston, N. J.
Henry Valve Co., Melrose Park, Ill.
Libbey-Owens-Ford Glass Co., Toledo, O.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
New York Air Valve Corp., Brooklyn, N. Y.
OPW Corp., Cincinnati, O.
Penberty Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.
Scientific Instrument Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Strahman Valves, Inc., New York, N. Y.
Swift Lubricator Co., The, Elmira, N. Y.
Uehling Instrument Co., Paterson, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.

GLASSES, SIGHT, FOR PIPE LINES
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Allin Mfg. Co., Chicago, Ill.
Chesterton Co., A. W., Everett, Mass.
Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Ernst Water Column & Gauge Co., Livingston, N. J.
Fischer & Porter Co., Hatboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
McIntire Co., The, Livingston, N. J.
Mueller Brass Co., Port Huron, Mich.
Norwood Associated Engineers, Inc., Springfield, Mass.
OPW Corp., Cincinnati, O.
Penberty Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Remco, Inc., Zelienople, Pa. (for refrigerant lines)
Sarco Co., Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Swift Lubricator Co., The, Elmira, N. Y.

GLOBE VALVES
See Valves, Globe

GLYCOL VAPORIZERS
See Units, Sterilizing, Air

GOVERNORS, PUMP
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
Cash Co., A. W., Decatur, Ill.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., Boody, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Synchro-Start Products, Inc., Skokie, Ill.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Willams Gauge Co., Inc., The, Pittsburgh, Pa.

GRILLES
See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovia, Calif.
Air-Path Products Co., Baltimore, Md. (stamped steel)
Alton Mfg. Co., Dallas, Tex.
American Warming & Ventilating Co., Toledo, O.
Auer Register Co., Cleveland, O.
Austin Engineering & Mfg. Co., Inc., Ysleta, Tex.
Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Bowman Co., D. F., New Albany, Ind.
Carnes Corp., Verona, Wis.
Central Iron & Wire Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Corbman Bros., Inc., Philadelphia, Pa.
Diamond Mfg. Co., Wyoming, Pa.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
General Register Corp., Cedar Grove, N. J.
Harrington & King Perforating Co., Inc., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Johnston & Chapman Co., Chicago, Ill.
Lima Register Co., The, Lima, O.
Louvra Mfg. & Sales Co., Union, N. J.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Midco Register Corp., St. Paul, Minn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mundt & Sons, Charles, Jersey City, N. J.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Kinston, N. C.
Thermotank, Inc., Products Div., Detroit, Mich.
Titus Mfg Corp., Waterloo, Iowa.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Viking Mfg. Corp., Cleveland, O.
Waterloo Register Co., Inc., Waterloo, Ia.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Young Regulator Co., Cleveland, O.

GRINDERS AND GRINDING WHEELS, WELD
Albertson & Co., Inc., Sioux City, Ia.
Baldor Electric Co., St. Louis, Mo.
Black & Decker Mfg. Co., The, Towson, Md.
Buckeye Tools Corp., Dayton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Franklin Balmar Corp., Baltimore, Md.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Norton Co., Worcester, Mass.
Portable Electric Tools, Inc., Chicago, Ill.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rotor Tool Co., Cleveland, O.
Skil Corp., Chicago, Ill.
Speedway Mfg. Co., Div. of Thor Power Tool Co., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Stanley Works, The, New Britain, Conn.
Thor Power Tool Co., Chicago, Ill.
United States Electrical Tool Co., Cincinnati, O.

GROOVERS, PLASTER, ELECTRIC, PORTABLE
Wodack Electric Tool Corp., Chicago, Ill.

GUARDS, THERMOSTAT, TO PREVENT TAMPERING
Burke Engineering Co., Los Angeles, Calif.
Powers Regulator Co., Skokie, Ill.

GUNS, POTS AND CANDLES, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT
Air Control Products, Inc., Coopersville, Mich.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Kilgore, Inc., International Flare-Signal Div., Westerville, O.
Mine Safety Appliances Co., Pittsburgh, Pa.

HAMMERS, ELECTRIC, PORTABLE
Black & Decker Mfg. Co., The, Towson, Md.
Hamer-Dril Co., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Millers Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Port City Machine & Tool Co., Muskegon, Mich.
Rotor Tool Co., Cleveland, O.
Stanley Works, The, New Britain, Conn.
Super Slugger Co., Bedford, O.
Syntron Co., Homer City, Pa.
Wodack Electric Tool Corp., Chicago, Ill.

HAND SHEARS
See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR
American Radiator & Standard Sanitary Corp., New York, N. Y.
Arjac Products, Inc., Rochester, N. Y.
Carpenter & Paterson, Inc., Cambridge, Mass.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Gateway Engineering Co., Chicago, Ill.
Hartmann Co., Chas., Brooklyn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Jennison Co., The, Fitchburg, Mass. (Adjustable radiator foot rest)
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Modern Hanger Corp., The, Cleveland, O.
National-U. S. Radiator Corp., Johnstown, Pa.
Rittling Corp., The, Buffalo, N. Y.
Unistrut Products Co., Chicago, Ill.

HANGERS, PIPE, CONSTANT SUPPORT (SPRING)
Basic Engineers, Inc., Sharpsburg, Pa.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Modern Hanger Corp., The, Cleveland, O.

HANGERS AND SUPPORTS, DUCT
Acme Mfg. Co., Philadelphia, Pa.
Adelta Mfg. Co., Inc., Philadelphia, Pa. (galvanized)
Bergen Pipesupport Corp., New York, N. Y. (variable spring & constant supports)
Clayton & Lambert Mfg. Co., Louisville, Ky. (metal)
Corbman Bros., Inc., Philadelphia, Pa.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Finn & Co., Inc., T. R., Hawthorne, N. J. (vibration)
Hexdall Co., A. M., Morris, Ill. (duct and furnace round pipe, furnace, square)
Inland Steel Products Co., Milwaukee, Wis. (galvanized)
Omark Industries, Portland, Ore.
Moore Inc., Goodloe E., Danville, Ill.
Mueller Brass Co., Port Huron, Mich (perforated strap)
Phillips Drill Co., Michigan City, Ind. (self-drilling expansion shells)
Redi-Bolt, Inc., East Chicago, Ind. (continuous threaded steel rod)
Remington Arms Co., Inc., Bridgeport, Conn. (stud, pin and threaded types)

Steel City Electric Co., Pittsburgh, Pa. (trapeze)
Unistrut Products Co., Chicago, Ill.
Velocity Power Tool Co., Div. of Mine Safety Appliances Co., Pittsburgh, Pa. (cartridge stud driver)
Williamson Co., Cincinnati, O. (galvanized)

HANGERS AND SUPPORTS, PIPE

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y. (cast)
Air-Path Products Co., Baltimore, Md. (inserts)
American Tube Products, Inc., West Warwick, R. I. (copper tube)
Armart Mfg. Co., Pittsfield, Mass. (copper tube hangers & straps, wire pipe hooks, galv. pipe straps, and perforated hanger iron)
Basic Engineers Inc., Sharpsburg, Pa.
Bergen Pipesupport Corp., New York, N. Y. (variable spring, constant support and hanger assemblies)
Blaw Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa. (spring and solid)
Carpenter & Paterson, Inc., Cambridge, Mass.
Chase Brass & Copper Co., Waterbury, Conn. (copper strap)
Commercial Plastics Co., Chicago, Ill. (plastic strap)
Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Finn & Co., Inc., T.R., Hawthorne, N. J. (Rubber-in-shear & steel spring)
Frick Co., Waynesboro, Pa.
Gateway Engineering Co., Chicago, Ill.
General Fittings Co., East Greenwich, R. I. (strap hangers)
Gerrard & Co., A. J., Melrose Park, Ill. (strap)
Globe Products, Huppower Div., Hupp Corp., Detroit, Mich. (clevis swivel)
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Handy Angle Div., The Lugall Co., Haverford, Pa.
Holub Industries, Inc., Sycamore, Ill. (steel and plastic)
Industrial Sheet Metal Work, Chicago, Ill.
Industrial Tubular Equipment Co., North Hollywood, Calif.
Korfund Co., Inc., Long Island City, N. Y.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y. (spring hangers and roller hangers)
Midwest Piping Co., Inc., St. Louis, Mo.
Minerallac Electric Co., Chicago, Ill.
Modern Hanger Corp., The, Cleveland, O.
Moore Inc., Goodloe E., Danville, Ill.
Mult-A-Frame Div., Ainsworth Mfg. Corp., Detroit, Mich.
National-U. S. Radiator Corp., Johnstown, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa. (counterpoise)
Nibco, Inc., Elkhart, Ind. (copper tube)
Omark Industries, Portland, Ore.
Paine Co., Addison, Ill. (snug fit wire pipe hooks; pipe straps; rings and bolts; perforated hanger iron)
Phillips Drill Co., Michigan City, Ind. (self-drilling expansion shells)
Piping Specialties, Inc., New York, N. Y. (anchor and guide for expansion joints; spring and all types)
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., Cleveland, O. (conduit clips)
Ravena Iron Co., Ravena, N. Y. (hook plates)
Redi-Bolt, Inc., East Chicago, Ind. (continuous threaded steel rod)
Remington Arms Co., Inc., Bridgeport, Conn. (stud, threaded type)
Ritter Pattern & Casting Co., New York, N. Y. (jack type adjustable tunnel stanchion and tunnel stanchion brackets with U bolts)
Rockwood Sprinkler Co., Worcester, Mass.
Saussé & Co., M. W., Los Angeles, Calif. (cork, rubber-in-shear, and spring)
Schaub Engineering Co., Fred H., Chicago, Ill. (pipe stands)
Steel City Electric Co., Pittsburgh, Pa. (clamps, clips, rollers, hangers)
Stic-Klip Mfg. Co., Inc., Cambridge, Mass. (for small pipe and tubing)
Truscon Steel Div., Republic Steel Corp., Youngstown, O. (pressed steel inserts)
Unistrut Products Co., Chicago, Ill.
Velocity Power Tool Co., Div. of Mine Safety Appliances Co., Pittsburgh, Pa. (cartridge stud driver)
Vibration Mountings, Inc., Corona, N. Y. (vibration hangers)
Western Wire Products Co., St. Louis, Mo. (wire pipe hooks and perforated hanger iron; copper tubing hanger & slings; galvanized and copper coated pipe straps)

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HARDWARE

See Parts for Heating and Air Conditioning Equipment

HEADERS, PIPE, WELDED

Albert Pipe Supply Co., Brooklyn, N. Y.
Alco Products, Inc., Schenectady, N. Y.
American Pipe & Steel Corp., Alhambra, Calif.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Atlantic Pipe Bending & Fabricating Corp., Wood-Ridge, N. J.
Biggs Boiler Wks. Co., The, E. Akron, O.
Blaw Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Buffalo Tank Corp., Dunellen, N. J.
Chicago Nipple Mfg. Co., Oak Park, Ill.
Clow & Sons, Inc., James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crane Co., Chicago, Ill.
Crotty Mfg. Corp., Flushing, Long Island, N. Y.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Fluor Products Co., Whittier, Calif.
Grinnell Co., Inc., Providence, R. I.
Heat & Power Corp., Baltimore, Md.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Kellogg Co., M. W., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Philadelphia Pipe Bending Co., Philadelphia.
Pittsburgh Pipe Coil & Bending Co., Etna, Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Portland Copper and Tank Works, Inc., South Portland, Me.
Reco Products Div., Recony Corp., New York, N. Y.
Red Jacket Co., Inc., Carnegie, Pa.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
Star Tubular Products Co., Chicago, Ill.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taylor Engineering Corp., Detroit, Mich.
Taylor Forge & Pipe Wks., Chicago, Ill.
U. S., Valve & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Walworth Co., New York, N. Y.
Western Piping & Engineering Co., Inc., San Francisco, Calif.
Whitlock Mfg. Co., W. Hartford, Conn.

HEADS, EXHAUST, FOR PIPE LINES

Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Centrifix Corp., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Swartwout Co., The, Cleveland, O.
U. S. Valve & Mfg. Co., San Francisco, Calif.
Wright-Austin Co., Detroit, Mich.

HEADS, SAFETY

Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Falls Industries, Inc., Solon, O.

HEADS, SPRINKLER, FOR FIRE PROTECTION

Grinnell Co., Inc., Providence, R. I.
Hodgman Mfg. Co., Inc., Taunton, Mass.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Finned, Cooling; Surface, Finned, Heating

HEAT PUMPS

See Units, Air Conditioning, Reverse Refrigeration Cycle

HEAT RECOVERY UNITS

See Units, Heat Recovery

HEAT REGENERATORS

See Units, Heat Recovery

HEATERS, AIR, DIRECT FIRED, COAL

For Furnaces for Central Plant Installation, EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

American Furnace Co., St. Louis, Mo.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Meyer Furnace Co., The, Peoria, Ill.
National Heater Co., Inc., St. Paul, Minn.
Rosebraugh Co., W. W., Salem, Ore.

HEATERS, AIR, DIRECT FIRED, COMBINATION GAS AND OIL

For Furnaces for Central Plant Installation, EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O.
Auto-Therm Mfg. Co., Detroit, Mich.
Campbell Co., E. K., Kansas City, Mo.
Chicago Steel Furnace Co., Chicago, Ill.
Delta Heating Corp., Trenton, N. J.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems Co., Chicago, Ill.
Freeman Heating Div., Illinois Iron & Bolt Co., Carpentersville, Ill.
Gas Machinery Co., Cleveland, O.
Inland Heater Corp., Minneapolis, Minn.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Lee Corp., Wilmington, Del.
Lennox Industries Inc., Des Moines, Ia.
Lennox Industries Inc., Columbus, O.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mammoth Furnace Co., Minneapolis, Minn.
National Heater Co., Inc., St. Paul, Mich.
Newcomb-Detroit Co., Detroit, Mich.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Reznor Mfg. Co., Mercer, Pa.

HEATERS, AIR, DIRECT FIRED, GAS, CENTRIFUGAL FAN TYPE

For Furnaces for Central Plant Installation, EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.

American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O.
Auburn Burner Co., Auburn, Ind.
Auto-Therm Mfg. Co., Detroit, Mich.
Besser Furnace and Air Conditioning Corp., Charlotte, N. C.
Burdett Mfg. Co., Chicago, Ill.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
Chicago Steel Furnace Co., Chicago, Ill.
David-Ludwig Co., Detroit, Mich.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems Co., Chicago, Ill.
General Gas Light Co., Kalamazoo, Mich.
Hastings Air Control, Inc., Omaha, Nebr.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Inland Heater Corp., Minneapolis, Minn.
Jackson & Church Co., Saginaw, Mich.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, O.
Johnson Heater Corp., Chelsea, Mass. (with and without ducts)
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Lennox Industries Inc., Des Moines, Ia.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mammoth Furnace Co., Minneapolis, Minn.
Mid-Continent Metal Products Co., Chicago, Ill.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National Heater Co., Inc., St. Paul, Minn.
Newcomb-Detroit Co., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
OverHead Heaters, Inc., Detroit, Mich.
Payne Company, La Puente, Calif.
Peerless Mfg. Div., Dover Corp., Louisville, Ky.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Reznor Mfg. Co., Mercer, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Sterlairco, Inc., Westfield, Mass.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Surface Combustion Corp., Toledo, O.
Tjernlund Mfg. Co., St. Paul, Minn.
Tuck-Aire Furnace Co., San Francisco, Calif.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Utility Appliance Corp., Los Angeles, Calif.
Vapor Heating Corp., Chicago, Ill.
Young Radiator Co., Racine, Wis.
Zink Co., John, Tulsa, Okla.

HEATERS, AIR, DIRECT FIRED, GAS, PORTABLE, FOR SPACE HEATING

(State capacity)

Auto-Therm Mfg. Co., Detroit, Mich. (400,000 to 2,000,000 Btu per hr output)
Bica Co., Girard, O. (50,000-85,000 Btu)
Coleman Co., Inc., The, Wichita, Kans.
Insto-Gas Corp., Detroit, Mich.
National Heater Co., Inc., St. Paul, Minn.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Reznor Mfg. Co., Mercer, Pa. (400,000 to 2,000,000 Btu per hr output)
Summit Products Co., Uniontown, Pa. (125,000 to 250,000 Btu)
Union Chill Mat Co., Pittsburgh, Pa.

HEATERS, AIR, DIRECT FIRED, OIL, FLOOR TYPE

For Furnaces for Central Plant Installation, EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Auto-Therm Mfg. Co., Detroit, Mich.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
Chicago Steel Furnace Co., Chicago, Ill.
Delta Heating Corp., Trenton, N. J.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems Co., Chicago, Ill.
Freeman Heating Div., Illinois Iron & Bolt Co., Carpentersville, Ill.

Gilbert & Barker Mfg. Co., West Springfield, Mass.
Inland Heater Corp., Minneapolis, Minn.
Jackson & Church Co., Saginaw, Mich.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, O.
Johnson Heater Corp., Chelsea, Mass. (with and without ducts)
Lee Corp., Wilmington, Del.
Lennox Industries Inc., Des Moines, Ia.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mammoth Furnace Co., Minneapolis, Minn.
Meyer Furnace Co., The, Peoria, Ill.
Midland-Ross Corp., New York, N. Y.
National Heater Co., Inc., St. Paul, Minn.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Reznor Mfg. Co., Mercer, Pa.
Tjernlund Mfg. Co., St. Paul, Minn.
Vapor Heating Corp., Chicago, Ill.
Williams Div., Eureka Williams Corp., Bloomington, Ill.
York-Shipley, Inc., York, Pa.

HEATERS, AIR, DIRECT FIRED, OIL, PORTABLE, FOR SPACE HEATING

Air Conditioning Engineering Co., Cambridge, Mass. (200,000; 285,000; 425,000 and 635,000 Btu)
Airtherm Mfg. Co., St. Louis, Mo. (400,000 to 2,000,000 Btu output per hr)
American Foundry & Furnace Co., Bloomington, Ill. (400,000-2,000,000 Btu per hr)
Auburn Burner Co., Auburn, Ind.
Auto-Therm Mfg. Co., Detroit, Mich. (400,000 to 2,000,000 Btu per hr output)
Campbell Heating Co., Des Moines, Ia. (Up to 3,150,000 Btu)
Cauhorn Distributing Co., Detroit, Mich. (190,000 Btu)
Certified Furnace Corp., Trenton, N. J. (112 — 280,000 Btu per hr output)
Chicago Steel Furnace Co., Chicago, Ill.
Clayton Mfg. Co., El Monte, Calif.
Coleman Co., Inc., The, Wichita, Kans.
Delta Heating Corp., Trenton, N. J.
Interstate Heater Mfg. Co., Denver, Colo. (80,000-180,000 Btu per hr)
Jackson & Church Co., Saginaw, Mich. (400,000 Btu — 2,000,000 Btu per hr output at Bonnet)
Johnson Heater Corp., Chelsea, Mass. (500,000 Btu)
Lennox Industries Inc., Marshalltown, Ia. (245,000 Btu per hr)
Master Vibrator Co., Dayton, O.
National Heater Co., Inc., St. Paul, Minn.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn. (100,000 Btu up to 2,225,000 Btu)
Quiet Automatic Oil Burner Corp., Newark, N. J.
Reznor Mfg. Co., Mercer, Pa. (400,000 to 2,000,000 Btu per hr output)
Stow Mfg. Co., Binghamton, N. Y.
Tjernlund Mfg. Co., St. Paul, Minn.

HEATERS, AIR, DIRECT FIRED, OIL, SUSPENDED TYPE

For Furnaces for Central Plant Installation, EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Furnace Co., St. Louis, Mo.
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O.
Auburn Burner Co., Auburn, Ind.
Auto-Therm Mfg. Co., Detroit, Mich.
Bard Mfg. Co., Bryan, O.
Besser Furnace and Air Conditioning Corp., Charlotte, N. C.
Campbell Co., E. K., Kansas City, Mo.
Century Engineering Corp., Cedar Rapids, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Cox Mfg. Co., Ridgeville, Ind.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Delta Heating Corp., Trenton, N. J.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Freeman Heating Div., Illinois Iron & Bolt Co., Carpentersville, Ill.

General Automatic Products Corp., Baltimore, Md.
Ingersoll Conditioned Air Div., Borg-Warner Corp., Kalamazoo, Mich.
Inland Heater Corp., Minneapolis, Minn.
Interstate Heater Mfg. Co., Denver, Colo.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Lee Corp., Wilmington, Del.
Lennox Industries Inc., Des Moines, Ia.
Lennox Industries Inc., Columbus, O.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National Heater Co., Inc., St. Paul, Minn.
Olsen Mfg. Co., C. A., Elyria, O.
OverHead Heaters, Inc., Detroit, Mich.
Patten Co., J. V., Sycamore, Ill.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Reznor Mfg. Co., Mercer, Pa.
Scaife Co., Oakmont, Pa.
Syncromatic Corp., Watertown, Wis.
Thermo-Products, Inc., North Judson, Ind.
Tjernlund Mfg. Co., St. Paul, Minn.
Viking Mfg. Corp., Cleveland, O.
Waterman-Waterbury Co., The, Minneapolis, Minn.
Weatherall Engineers, Inc., Providence, R. I.
Williams Div., Eureka Williams Corp., Bloomington, Ill.
Williamson Co., Cincinnati, O.
York-Shipley, Inc., York, Pa.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Consolidated Metal Products Corp., Albany, N. Y.
Electrend Products Corp., St. Joseph, Mich.
Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
Falcon Equipment Co., New Brighton, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Heatube Corp., Allegan, Mich.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering Equipment Co., Davenport, Ia.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Montgomery Bros., San Francisco, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trent, Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Waage Electric, Inc., Kenilworth, N. J.
Wesix Electric Heater Co., San Francisco.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

HEATERS, DUCT, GAS

Auto-Therm Mfg. Co., Detroit, Mich.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Campbell Heating Co., Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
General Gas Light Co., Kalamazoo, Mich.
Hastings Air Control, Inc., Omaha, Nebr.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Inland Heater Corp., Minneapolis, Minn.
Jackson & Church Co., Saginaw, Mich.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, O.
Kehm Corp., The, Chicago, Ill.
Kleer Kleen Mfg. Co., Hayward, Calif.
Lennox Industries Inc., Marshalltown, Ia.
Maxon Premix Burner Co., Muncie, Ind.
Meyer Furnace Co., The, Peoria, Ill.
Modine Mfg. Co., Racine, Wis.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National Heater Co., Inc., St. Paul, Minn.
Norman Products Co., Inc., Columbus, O.
Olsen Mfg. Co., C. A., Elyria, O.
OverHead Heaters, Inc., Detroit, Mich.
Payne Company, La Puente, Calif.
Peerless Mfg. Div., Dover Corp., Louisville.
Reznor Mfg. Co., Mercer, Pa.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.

Sterlairco, Inc., Westfield, Mass.
Surface Combustion Corp., Toledo, O.
Tuck-Aire Furnace Co., San Francisco, Calif.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Utility Appliance Corp., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Williamson Co., The, Cincinnati, O.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

HEATERS, DUCT, OIL FIRED

Auto-Therm Mfg. Co., Detroit, Mich.
Campbell Heating Co., Des Moines, Ia.
Century Engineering Corp., Cedar Rapids, Ia.
Certified Furnace Corp., Trenton, N. J.
Chicago Steel Furnace Co., Chicago, Ill.
Delta Heating Corp., Trenton, N. J.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Inland Heater Corp., Minneapolis, Minn.
Interstate Heater Mfg. Co., Denver, Colo.
Jackson & Church Co., Saginaw, Mich.
Kleer Kleen Mfg. Co., Hayward, Calif.
National Heater Co., Inc., St. Paul, Minn.
OverHead Heaters, Inc., Detroit, Mich.
Republic Products Co., Philadelphia, Pa.
Viking Mfg. Corp., Cleveland, O.
Williamson Co., The, Cincinnati, O.

HEATERS, ELECTRIC, OIL-HEATING, FOR PREVENTING FOAMING IN CRANKCASE COMPRESSOR OIL

Electrofilm, Inc., North Hollywood, Calif.
Electro-Therm, Inc., Silver Spring, Md.
Heatube Corp., Allegan, Mich.
Vulcan Electric Co., Danvers, Mass.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
Coleman Co., Inc., The, Wichita, Ks.
Fluid Heat Div., Anchor Post Products Inc., Baltimore, Md.
National Heater Co., Inc., St. Paul, Minn.
Perfection Industries Div., Hupp Corp., Cleveland, O.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Surface Combustion Corp., Toledo, O.

HEATERS, INDIRECT, SUBMERGED

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Buxton Mfg. Co., Dover, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
General Ceramics Corp., Keasbey, N. J. (graphite)
General Fittings Co., East Greenwich, R. I.
Graham Mfg. Co., Inc., New York, N. Y.
Heat More Tankless Heater Co., Cambridge, Mass.
Heatube Corp., Allegan, Mich.
Killebrew Engineering Corp., St. Louis, Mo.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Newcomb-Detroit Co., Detroit, Mich. (gas)
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Richmond Engineering Co., Richmond, Va.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Cranston, R. I.
Western Blower Co., Seattle, Wash.
Yula Water Heaters, Inc., Bronx, N. Y.

HEATERS, OIL

See Preheaters, Fuel Oil; Units, Fuel Oil, Heating, Pumping and Straining

HEATERS, OIL TANK, SUCTION BELL

California Steel Products, Div. of Yuba Consolidated Industries, Inc., Richmond, Calif.
Davis Engineering Corp., Elizabeth, N. J.

Hauck Mfg. Co., Brooklyn, N. Y.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Manning & Lewis Engineering Co., Newark, N. J.
Yula Water Heaters, Inc., Bronx, N. Y.

HEATERS, RADIATION, FOR SUPPLYING HOT WATER RADIATION FROM STEAM BOILER

Acme Welding, Div. of the United Tool & Die Co., West Hartford, Conn.
Alstrom Corp., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Lindy Heaters, Inc., New York, N. Y.
Mar-Coil Heater Co., Union City, N. J.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Viking Mfg. Corp., Cleveland, O.
Yula Water Heaters, Inc., Bronx, N. Y.

HEATERS, STEAM JET, FOR LIQUIDS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Duriron Co., Inc., The, Dayton, O.
Heil Process Equipment Corp., Cleveland, O.
National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Sims Pump Valve Co., Hoboken, N. J.

HEATERS, STRIP AND IMMERSION, ELECTRIC

Acme Electric Heating Co., Boston, Mass.
American Instrument Co., Inc., Silver Spring, Md.
Consolidated Metal Products Corp., Albany, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electro-Therm, Inc., Silver Spring, Md.
Falcon Equipment Co., New Brighton, Pa.
Ferro Electric Products, Inc., Kirkland, Ill. (electric heating elements for room air conditioners)
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Heatube Corp., Allegan, Mich.
Heil Process Equipment Corp., Cleveland, O.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
S&C Mfg. Co., Cincinnati, O.
Syntron Co., Homer City, Pa.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Waage Electric, Inc., Kenilworth, N. J.
Wesix Electric Heater Co., San Francisco.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, SUSPENDED, RADIANT, ELECTRIC

Berko Electric Mfg. Co., Queens Village, N. Y.
Corning Glass Works, Corning, N. Y.
Crystalheat Co., Van Nuys, Calif.
Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Electriglas Corp., Bergenfield, N. J.
Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Heatmore, Inc., Brooklyn, N. Y.
Heatube Corp., Allegan, Mich.
LaSalle Products, Inc., Buffalo, N. Y.
S&C Mfg. Co., Cincinnati, O.
Thermador Electrical Mfg., Los Angeles, Calif.
ThermoRay Corp., Newark, N. J.
Trent, Inc., Philadelphia, Pa.
Union Chill Mat Co., Pittsburgh, Pa.
Vulcan Electric Co., Danvers, Mass.

Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, SUSPENDED, RADIANT, GAS FIRED

Perfection Industries Div., Hupp Corp., Cleveland, O.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Union Chill Mat Co., Pittsburgh, Pa.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

Acme Electric Heating Co., Boston, Mass.
Ceilheat, Inc., Knoxville, Tenn.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Crystalheat Co., Van Nuys, Calif.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electriglas Corp., Bergenfield, N. J.
Electrofilm, Inc., North Hollywood, Calif.
Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
Electro-Therm, Inc., Silver Spring, Md.
Everwarm, Inc., Knoxville, Tenn.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Heatmore, Inc., Brooklyn, N. Y.
Heatube Corp., Allegan, Mich.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
LaSalle Products, Inc., Buffalo, N. Y.
Lintern Corp., Painesville, O.
Marviray, Inc., Newark, N. J.
Modernheat Cable Corp., Kingsport, Tenn.
Sunwarm, Inc., Kingsport, Tenn.
Thermador Electrical Mfg., Los Angeles.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT, EXPLOSION PROOF

Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
Electro-Therm, Inc., Silver Spring, Md.
Heatube Corp., Allegan, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
Trent, Inc., Philadelphia, Pa.
Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, GAS, PROPELLER FAN TYPE

Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
American Furnace Co., St. Louis, Mo.
Barwick Mfg. Corp., Wichita, Kan.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Burnham Corp., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Day & Night Mfg. Co., Monrovia, Calif.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
General Gas Light Co., Kalamazoo, Mich.
Grinnell Co., Inc., Providence, R. I.
Hastings Air Control, Inc., Omaha, Nebr.
Henry Furnace Co., The, Medina, O.
Ilg Electric Ventilating Co., Chicago, Ill.
Jackson & Church Co., Saginaw, Mich.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Mission Appliance Corp., Hawthorne, Calif.
Modine Mfg. Co., Racine, Wis.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Norman Products Co., Inc., Columbus, O.
Ohio Foundry & Mfg. Co., Steubenville, O.
Olsen Mfg. Co., C. A., Elyria, O.
Payne Company, La Puente, Calif.

Peerless Mfg. Div., Dover Corp., Louisville, Ky.
Pioneer Mfg. Co., Los Angeles, Calif.
Reznor Mfg. Co., Mercer, Pa.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Sterlairco, Inc., Westfield, Mass.
Surface Combustion Corp., Toledo, O
Temco, Inc., Nashville, Tenn.
Trane Co., The, La Crosse, Wis.
Tuck-Aire Furnace Co., San Francisco, Calif.
United States Air Conditioning Corp., Philadelphia, Pa.
Utility Appliance Corp., Los Angeles, Calif.
Vacuum Gas Burner, Olean, N. Y.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Worthington Corp., East Orange, N. J.
Young Radiator Co., Racine, Wis.
Zink Co., John, Tulsa, Okla.

HEATERS, UNIT, OIL, PROPELLER FAN TYPE

Delta Heating Corp., Trenton, N. J.
Ilg Electric Ventilating Co., Chicago, Ill.
Interstate Heater Mfg. Co., Denver, Colo.
Sterlairco, Inc., Westfield, Mass.

HEATERS, UNIT, STEAM AND HOT WATER, CABINET TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Inc., Detroit, Mich.
Brown Products Corp., Union, N. J.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Gannon Co., Inc., Russell R., The, Cincinnati, O.
Ilg Electric Ventilating Co., Chicago, Ill.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Recold Corp., Los Angeles, Calif.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Young Radiator Corp., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, CENTRIFUGAL FAN TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Inc., Detroit.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blazer & Son, M., Passiac, N. J.
Brown Products Corp., Union, N. J.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Gannon Co., Inc., Russell R., The, Cincinnati, O.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Recold Corp., Los Angeles, Calif.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, HORIZONTAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Burnham Corp., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Crane Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
King Co. of Owatonna, The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Kritzer Radiant Coils, Inc., Batavia, Ill.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Modine Mfg. Co., Racine, Wis.
Muckle Mfg. Co., Owatonna, Minn.
Murray Mfg. Co., D. J., Wausau, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Pacific Steel Boiler Div., National-U.S. Radiator Corp. Johnstown, Pa.
Rittling Corp., The, Buffalo, N. Y.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, VERTICAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Burnham Corp., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Crane Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Gallaher Co., The, Omaha, Neb.
Grinnell Co., Inc., Providence, R. I.
Ilg Electric Ventilating Co., Chicago, Ill.
Kritzer Radiant Coils, Inc., Batavia, Ill.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Rittling Corp., The, Buffalo, N. Y.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J. (Revolving)
Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Ventilators, Roof, Fan; Ventilators, Unit; Surface, Finned, Heating

HEATERS, WALL, CIRCULATING, ELECTRIC

Broan Mfg. Co., Inc., Hartford, Wis.
Ceilheat, Inc., Knoxville, Tenn.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Electrend Products Corp., St. Joseph, Mich.
General Electric Co., Wiring Device Dept., Providence, R. I.
LaSalle Products, Inc., Buffalo, N. Y.
Modernheat Cable Corp., Kingsport, Tenn.
Sunwarm, Inc., Kingsport, Tenn.
Thermador Electrical Mfg., Los Angeles, Calif.
ThermoRay Corp., Newark, N. J.
Trade-Wind Motorfans, Inc., Rivera, Calif. (wall insert type)
Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., Edwin L. Pittsburgh, Pa.

HEATERS, WALL, CIRCULATING, GAS FIRED

Advance Furnace Co., Wichita, Kans.
Coleman Co., Inc., The, Wichita, Kan.
Day & Night Mfg. Co., Monrovia, Calif.
Dearborn Stove Co., Dallas, Tex.
General Gas Light Co., Kalamazoo, Mich.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Lennox Industries Inc., Marshalltown, Ia.
Mission Appliance Corp., Hawthorne, Calif.
Ohio Foundry & Mfg. Co., Steubenville, O.
Payne Company, La Puente, Calif.
Peerless Mfg. Div., Dover Corp., Pittsburgh.
Pioneer Furnace Co., Los Angeles, Calif.
Pioneer Mfg. Co., Los Angeles, Calif.
Rheem Mfg. Co., Chicago, Ill.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Temco, Inc., Nashville, Tenn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Zink Co., John, Tulsa, Okla.

HEATERS, WALL, CIRCULATING, OIL FIRED

Delta Heating Corp., Trenton, N. J.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Kleer Kleen Mfg. Co., Hayward, Calif.
Kresky Mfg. Co., Petaluma, Calif.
Scaife Co., Oakmont, Pa.

HEATERS, WATER, AIR-TANKLESS

Tankless Water Heater and Compression Tank Combined

American Tube Products, Inc., West Warwick, R. I.
Bell & Gossett Co., Morton Grove, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
General Fittings Co., East Greenwich, R. I.
Lewis & Saunders, Lakeport, N. H.
Mar-Coil Heater Co., Union City, N. J.
Spi-Rol-Fin Corp., Pequannock, N. J.

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
Burnham Corp., Irvington, N. Y.
National-U. S. Radiator Corp., Johnstown, Pa.
Peerless Heater Co., The, Div. of The Eastern Foundry Co., Boyertown, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
Weil-McLain Co., Michigan City, Ind.

HEATERS, WATER, ELECTRIC

American Radiator & Standard Sanitary Corp., New York, N. Y.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Can Arm Corp., Champlain, N. Y.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Cleveland Heater Co., Cleveland, O.
Crane Co., Chicago, Ill.
Custom Engineering Co., Los Angeles, Calif.

Cutler-Hammer, Inc., Milwaukee, Wis.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Electro-Therm, Inc., Silver Spring, Md.
Frigidaire Div., General Motors Corp., Dayton, O.
Heat-X Inc., Brewster, N. Y.
Heatube Corp., Allegan, Mich.
Hotpoint Co., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis. Mo.
Koven & Bro., Inc., L. O., Jersey City, N. J.
McGraw-Edison Co., Clark Div., Chicago, Ill.
Mission Appliance Corp., Hawthorne, Calif.
Mor-Flo Heater Corp., Cleveland, O.
National-U. S. Radiator Corp., Johnstown, Pa.
Pioneer Mfg. Co., Los Angeles, Calif.
Precision Parts Corp., Nashville, Tenn.
Red Spot Electric Co., Tacoma, Wash.
Rheem Mfg. Co., Chicago, Ill.
Thermador Electric Mfg., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wood Co., John, Conshohocken, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, GAS FIRED

Ajax Boiler & Heater Co., Gardena, Calif.
Aldrich Co., Wyoming, Ill.
Allcraft Mfg. Co., Cambridge, Mass.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bica Co., Girard, O.
Bock Corp., Madison, Wis.
Brown Products Corp., Union, N. J.
Bryan Steam Corp., Peru, Ind.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Cleveland Heater Co., Cleveland, O.
Crane Co., Chicago, Ill.
Day & Night Mfg. Co., Monrovia, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edgewood Mfg. Co., Inc., El Monte, Calif.
Edwards Engineering Corp., Pompton Plains, N. J.
Equipco, Inc., Portland, Ore.
Hotstream Heater Co., Cleveland, O.
Hydrotherm, Inc., Northvale, N. J.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Laars Engineers, North Hollywood, Calif.
McGraw-Edison Co., Clark Div., Chicago, Ill.
Mission Appliance Corp., Hawthorne, Calif.
Montgomery Bros., San Francisco, Calif.
Mor-Flo Heater Corp., Cleveland, O.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National-U. S. Radiator Corp., Johnstown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Pioneer Mfg. Co., Los Angeles, Calif.
Radiant Heat and Cooling Co., Santa Clara, Calif.
Radiant Utilities Corp., Brooklyn, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Raypak Co., Inc., Los Angeles, Calif.
Rheem Mfg. Co., Chicago, Ill.
Rite Engineering & Mfg. Corp., Downey, Calif.
Ruud Mfg. Co., Kalamazoo, Mich.
Schoedinger, Inc., F. O., Columbus, O.
Sellers Engineering Co., Chicago, Ill.
Smith Co., Inc., H. B., The, Westfield, Mass.
Stout & Sons, David, St. Louis, Mo.
Viking Mfg. Corp., Cleveland, O.
Western Boiler Co., Los Angeles, Calif.
Wood Co., John, Conshohocken, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, INDIRECT

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Ajax Boiler & Heater Co., Gardena, Calif.
Alstrom Corp., New York, N. Y.
American Radiator & Standard Sanitary Corp., New York, N. Y.
American Tube Products, Inc., West Warwick, R. I.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Ellicott Fabricators, Inc., Baltimore, Md.
Ferguson & Lange Foundry Co., Chicago, Ill.
General Fittings Co., East Greenwich, R. I.
Graham Mfg. Co., Inc., New York, N. Y.
Harrison Sheet Steel Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Lewis & Saunders, Lakeport, N. H.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
National-U. S. Radiator Corp., Johnstown, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Rite Engineering & Mfg. Corp., Downey, Calif.
Sellers Engineering Co., Chicago, Ill.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., W. Hartford, Conn.
Yula Water Heaters, Inc., Bronx, N. Y.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alstrom Corp., New York, N. Y.
American Tube Products, Inc., West Warwick, R. I.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Buxton Mfg. Co., Dover, N. J.
Carpenter Heating & Air Conditioning Co., Cleveland, O.
Crotty Mfg. Corp., Flushing, Long Island, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Ellicott Fabricators, Inc., Baltimore, Md.
General Ceramics Corp., Keasbey, N. J. (graphite)
General Fittings Co., East Greenwich, R. I.
Hydrotherm, Inc., Northvale, N. J.
Killebrew Engineering Corp., St. Louis, Mo.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Richmond Engineering Co., Richmond, Va.
Sims Co., Erie, Pa.
Spi-Rol-Fin Corp., Pequannock, N. J.
Taco Heaters, Inc., Cranston, R. I.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Weil-McLain Co., Michigan City, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., W. Hartford, Conn.
Yula Water Heaters, Inc., Bronx, N. Y.

HEATERS, WATER, OIL FIRED

Aeroil Products Co., Inc., South Hackensack, N. J.
Ajax Boiler & Heater Co., Gardena, Calif.
Aldrich Co., Wyoming, Ill.
Auburn Burner Co., Auburn, Ind.
Bock Corp., Madison, Wis.
Brown Products Corp., Union, N. J.
Bryan Steam Corp., Peru, Ind.
Burnham Corp., Irvington, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Edwards Engineering Corp., Pompton Plains, N. J.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Hotstream Heater Co., Cleveland, O.
Johnson Co., S. T., Oakland, Calif.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National-U. S. Radiator Corp., Johnstown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Petro, Cleveland, O.
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Radiant Utilities Corp., Brooklyn, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rheem Mfg. Co., Chicago, Ill.
Rite Engineering & Mfg. Corp., Downey, Calif.
Smith Co., Inc., H. B., The, Westfield, Mass.
Vapor Heating Corp., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.
Way-Wolff Associates, Inc., New York, N. Y.
Western Boiler Co., Los Angeles, Calif.

HEATERS, WATER, STEAM, INSTANTANEOUS

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Aerco Corp., Northvale, N. J.
Alco Products, Inc., Schenectady, N. Y.
Alstrom Corp., New York, N. Y.
American Tube Products, Inc., West Warwick, R. I.
Bell & Gossett Co., Morton Grove, Ill.
Buxton Mfg. Co., Dover, N. J.
Coe Mfg. Co., Painesville, O. (safety water heater)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooley Co., E. C., San Francisco, Calif.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ellicott Fabricators, Inc., Baltimore, Md.
General Fittings Co., East Greenwich, R. I.
Graham Mfg. Co., Inc., New York, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
Heat More Tankless Heater Co., Cambridge, Mass.
Johnson Corp., The, Three Rivers, Mich.
Kewanee Boiler Div., American-Standard, Kewanee, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lewis & Saunders, Lakeport, N. H.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Marion Machine Foundry, Inc., Marion, Ind.
Montgomery Bros., San Francisco, Calif.
National Pipe Bending Co., New Haven, Conn
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pick Mfg. Co., West Bend, Wis. (direct steam injection)
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Radiant Utilities Corp., Brooklyn, N. Y.
Richmond Engineering Co., Richmond, Va.
Ross Heat Exchanger Div., American Radiator & Standard Sanitary Corp., Buffalo, N. Y.

Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Screw Machine Products Co., Portland, Ore.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Cranston, R. I.
Viking Mfg. Corp., Cleveland, O.
Whitlock Mfg. Co., W. Hartford, Conn.
Yula Water Heaters, Inc., Bronx, N. Y.

HEATERS, WATER, STEAM, STORAGE

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Aerco Corp., Northvale, N. J.
Alco Products, Inc., Schenectady, N. Y.
Alstrom Corp., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Ellicott Fabricators, Inc., Baltimore, Md.
General Fittings Co., East Greenwich, R. I.
Heat More Tankless Heater Co., Cambridge, Mass.
Johnson Corp., The, Three Rivers, Mich.
Kewanee Boiler Div., American-Standard, Kewanee, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lindy Heaters, Inc., New York, N. Y.
Lucey Boiler & Mfg. Corp., Chattanooga, Tenn.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Marion Machine Foundry, Inc., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Process Engineering, Inc., Methuen, Mass.
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Richmond, Va.
Schaub Engineering Co., Fred H., Chicago.
Sims Co., Erie, Pa.
Stout & Sons, David, St. Louis, Mo.
Taco Heaters, Inc., Cranston, R. I.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Tranter Mfg. Inc., Lansing, Mich.
Viking Mfg. Corp., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., W. Hartford, Conn.
Yula Water Heaters Inc., Bronx, N. Y.

HEATERS, WATER, STEEL, COAL FIRED

Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Finnigan & Co., Inc., J. J., Atlanta, Ga.
Johnston Bros., Inc., Ferrysburg, Mich.
Kewanee Boiler Div., American-Standard, Kewanee, Ill.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.

HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Finned, Heating

HEATING SURFACE

See Surface, Finned, Heating

HEATING AND VENTILATING UNITS

See Units, Heating and Ventilating, Horizontal Package Type

HIGH VELOCITY AIR SYSTEM PIPE

See Ducts, Spiral Welded

HIGH VELOCITY MIXING UNITS, SOUND AND VOLUME CONTROL, FOR AIR CONDITIONING SYSTEMS

See Units, Mixing, Sound and Volume Control, for Double Duct High Velocity Air Conditioning Systems

HOISTS, PORTABLE, FOR INSTALLING HEATING, PIPING AND AIR CONDITIONING EQUIPMENT

Aluminum Products, Inc., Fort Lauderdale, Fla.
Broad Crane & Engineering Service Co., Detroit, Mich.
Burtchaell Heating Co., Portland, Ore.
Chicago Pneumatic Tool Co., New York, N. Y.
Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Clipper Mfg. Co., Kansas City, Mo.
Coffing Hoist Div., Duff-Norton Co., Danville, Ill.
CraneVeyor Corp., Los Angeles, Calif.
Detroit Hoist & Machine Co., Detroit, Mich.
Gardner-Denver Co., Quincy, Ill.
Griphoist, Inc., San Francisco, Calif.
Harnischfeger Corp., Milwaukee, Wis.
Hastings Air Control, Inc., Omaha, Nebr.
Lug-All Co., The, Haverford, Pa.
Memco Crane Co., Oklahoma City, Okla.
Multiple Corp., Dayton, O.
Thern Machine Co., Winona, Minn.
Thor Power Tool Co., Chicago, Ill.
Wallace Products Co., B. E., Exton, Pa. (adjustable tripods, gantries)

HOLDERS AND FILES, CATALOG, FOR ENGINEERS' AND CONTRACTORS' OFFICES

Geneva Mfg. Co., South Elgin, Ill.

HOODS, FUME DISPOSAL, LABORATORY

Atlas Mineral Products Co., Mertztown, Pa.
Ceilcote, Inc., Cleveland, O.
Corite Products, Inc., Chicago, Ill. (plastic)
DuVerre, Inc., Buffalo, N. Y. (plastic)
Ervite Corp., Erie, Pa.
General Metals, Inc., Greensboro, N. C.
Griffin & Co., Louisville, Ky.
Heil Process Equipment Corp., Cleveland, O.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Kewaunee Mfg. Co., Adrian, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mirror Patented Stove Pipe Co., Hartford, Conn.
Schneible Co., Claude B., Detroit, Mich.
Sheldon Equipment Co., E. H., Muskegon, Mich.
United Sheet Metal Co., Inc., Columbus, O.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O.
Yerzley & Co., Newark, N. J.
Zack Co., The, Chicago, Ill.

HOSE CLAMPS

See Clamps, Hose

HOSE, FLEXIBLE, METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
Airaterra (Roylyn Products), Glendale, Calif.
American Metal Hose Div., American Brass Co., Waterbury, Conn.
Ammerman Inc., Minneapolis, Minn.
Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Breeze Corporations, Inc., Union, N. J.
Chiksan Co., Brea, Calif.
Cobra Metal Hose Div., Chicago, Ill.
Dole Refrigerating Co., Chicago, Ill.
Finn & Co., Inc., T. R., Hawthorne, N. J.
Flexaust Co., New York, N. Y.
Flexible Metal Hose Mfg. Co., Costa Mesa, Calif.
Flexible Tubing Corp., Guilford, Conn.
Flexonics Corp., Maywood, Ill.
Goodall Rubber Co., Trenton, N. J.
International Metal Hose Co., Bellevue, O.
Johnson Metal Hose, Inc., Waterbury, Conn.
Marquette Coppersmithing Co., Philadelphia, Pa.
Mic-Lin Co., Maple Shade, N. J.
Packless Metal Hose, Inc., Mt. Vernon, N. Y.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Perfecting Service Co., Charlotte, N. C.
Seamlex Co., Inc., Long Island City, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Titeflex, Inc., East Springfield, Mass.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
United Metal Hose Co., Inc., Long Island City, N. Y.
Universal Metal Hose Co., Chicago, Ill.
Vibration Mountings, Inc., Corona, N. Y.
Zallea Brothers, Wilmington, Del.

HOSE, NON-METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
Aeroquip Corp., Western Div., Burbank, Calif.
Aeroquip, Inc., Van Wert, O.
Airaterra (Roylyn Products), Glendale, Calif.
Ammerman Inc., Minneapolis, Minn.
Anchor Coupling Co., Libertyville, Ill.
Anchor Packing Co., Philadelphia, Pa.
Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.
Binks Mfg. Co., Chicago, Ill.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
De Vilbiss Co., The, Toledo, O.
Electric Hose & Rubber Co., Wilmington, Del.
Fine Products Co., Berwyn, Ill.
Flexaust Co., New York, N. Y.
Flexible Tubing Corp., Guilford, Conn.
Flexonics Corp., Maywood, Ill.
Gates Rubber Co., The, Denver, Colo.
Goodrich Industrial Products Co., B. F., Akron, O. (rubber)
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hewitt-Robins Inc., Stamford, Conn.
Imperial Brass Mfg. Co., Chicago, Ill.
LE-HI Div., Hose Accessories Co., Philadelphia, Pa.
Newage Industries, Inc., Jenkintown, Pa.
New York Belting & Packing Co., Passaic, N. J.
Polymer Corp. of Pa., The, Reading, Pa. (nylon pressure tubing)
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
Research Vacuum Supply Co., Chicago, Ill.
Resistoflex Corp., Roseland, N. J.
Snap-Tite, Inc., Union City, Pa.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Thermoid Co., Trenton, N. J.
Thor Power Tool Co., Chicago, Ill.
Titeflex, Inc., East Springfield, Mass.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
United States Rubber Co., New York, N. Y.
Vibration Mountings, Inc., Corona, N. Y.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.

HOSE, VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Flexible, Non-Metallic

HOSPITAL OPERATING ROOM AIR CONDITIONING UNITS

See Units, Air Conditioning, Exclusively for Hospital Operating Rooms

HOT GAS DEFROSTING

See Systems, Hot Gas Defrosting for Refrigeration

HOT WATER HEATING AND CHILLED WATER SYSTEMS, BALANCING ELBOWS AND TEES FOR

See Elbows and Tees, Balancing, for Hot Water Heating and Chilled Water Systems

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

Airfan Engineering Co., Los Angeles, Calif.
Ammerman Inc., Minneapolis, Minn.
Barry Blower Co., Minneapolis, Minn.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brookside Corp., McCordsville, Ind.
Brundage Co., The, Kalamazoo, Mich.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Clarage Fan Co., Kalamazoo, Mich.
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
Ervite Corp., Erie, Pa.
Garden City Fan Co., Niles, Mich.
General Blower Co., Morton Grove, Ill.
Haveg Industries, Inc., Newark, Del. (plastic for corrosive fumes)
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
Morrison Products, Inc., Cleveland, O.
Phoenix Products Co., Milwaukee, Wis. (spun inlets)
Power Engineering Corp., Weirton, W. Va.
Revcor Inc., Carpentersville, Ill.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Torit Mfg. Co., St. Paul, Minn.
Torrington Mfg. Co., The, Torrington, Conn.
United Sheet Metal Co., Inc., Columbus, O.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Utica Products, Inc., Utica, N. Y.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.

HOUSINGS, FAN, PROPELLER

(Housing only—not complete fans)

Allen Cooler & Ventilator, Inc., Rochester, Mich.
Ammerman Inc., Minneapolis, Minn.
Atmos Corp., Chicago, Ill.
Brookside Corp., McCordsville, Ind.
Chicago Blower Corp., Franklin Park, Ill.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Commercial Shearing & Stamping Co., Youngstown, O.
Ervite Corp., Erie, Pa.
General Blower Co., Morton, Ill.
Haveg Industries, Inc., Newark, Del. (plastic for corrosive fumes)
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
International Engineering, Inc., Dayton, O.
Kody Blower Co., Trenton, N. J.
Martin Fan & Blower Co., Chicago, Ill.
Phoenix Products Co., Milwaukee, Wis. (spun inlets)
United Sheet Metal Co., Inc., Columbus, O.

HUMIDIFIERS, CENTRAL PLANT

Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Moistening Co., Providence, R. I.
Armstrong Machine Wks., Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Cleveland Humidifier Co., Cleveland, O.
Farr Co., Los Angeles, Calif.
General Filters, Inc., Novi, Mich.
HERRmidifier Co., Neffsville, Pa.
Johnson Service Co., Milwaukee, Wis.
Little Giant Pump Co., Div. of Little Giant Vaporizer Co., Inc., Oklahoma City, Okla. (vaporizers for humidifiers)
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Powers Regulator Co., Skokie, Ill.
Research Products Corp., Madison, Wis.
Southworth Machine Co., Portland, Me.
Steel Products Engineering Co., Springfield, O.
Surface Combustion Corp., Toledo, O.
Trane Co., The, LaCrosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Walton Laboratories, Inc., Irvington, N. J.
Water Cooling Corp., New York, N. Y.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

HUMIDIFIERS, DIRECT, SPRAY HEAD

Abbeon Supply Co., Jamaica, N. Y.
American Moistening Co., Providence, R. I.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C. (Centrifugal)
Binks Mfg. Co., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Grinnell Co., Inc., Providence, R. I.
HERRmidifier Co., Neffsville, Pa.
Lennox Industries, Inc., Marshalltown, Ia.
Maid-O'-Mist, Inc., Chicago, Ill.
Marlo Coil Co., St. Louis, Mo.
Murray Mfg. Co., D. J., Wausau, Wis.
Parks-Cramer Co., Fitchburg, Mass.
R. I. Humidifier & Ventilating Co., Inc., Cambridge, Mass.
Roberson, Inc., Seattle, Wash.
Ross Sprinkler Co., Rosemead, Calif.
Spray Engineering Co., Burlington, Mass.
Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Walton Laboratories, Inc., Irvington, N. J.
Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

Maid-O'-Mist, Inc., Chicago, Ill.

HUMIDIFIERS, RADIATOR VENT VALVE

G & H Mfg. Co., Philadelphia, Pa.
Maid-O'-Mist, Inc., Chicago, Ill.

HUMIDIFIERS, UNIT, ROOM TYPE

(Without Heating)

Abbeon Supply Co., Jamaica, N. Y.
American Moistening Co., Providence, R. I.
Armstrong Machine Wks., Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
Fresh'nd-Aire Co., Div. of Corey Corp., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
HERRmidifier Co., Neffsville, Pa.
Kelvinator Div., American Motors Corp., Detroit, Mich.
McGraw-Edison Co., Lonergan Coolerator Div., Albion, Mich.
Murray Mfg. Co., D. J., Wausau, Wis.
Research Products Corp., Madison, Wis.
Spraying Systems Co., Bellwood, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Walton Laboratories, Inc., Irvington, N. J.
Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Parks-Cramer Co., Fitchburg, Mass.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Trerice Co., H. O., Detroit, Mich.
Walton Laboratories, Inc., Irvington, N. J.

HUMIDITY INDICATORS

See Indicator-Controllers, Relative Humidity; Psychrometers

HUMIDITY RECORDERS

See Recorders, Humidity

HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC CLUTCHES

See Drives, Fluid or Hydraulic, for Power Transmission

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

Abbeon Supply Co., Jamaica, N. Y.
Airguide Instrument Co., Chicago, Ill.
Airserco Mfg. Co., Pittsburgh, Pa.
American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Scientific Equipment Co., Philadelphia, Pa.
H-B Instrument Co., Philadelphia, Pa.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Johnson Service Co., Milwaukee, Wis.
Manufacturers Engineering & Equipment Corp., Hatboro, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electric Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Will Corp., Rochester, N. Y.

HYGROSTATS

See Humidistats

IDENTIFICATION MARKERS (For Piping Services)

Brady Co., W. H., Milwaukee, Wis. (self-sticking)
Markal Co., Chicago, Ill.
North Shore Nameplate Inc., Bayside, N. Y. (also for wiring and conduit systems)
Pee Cee Tape & Label Co., Los Angeles, Calif.
Seton Name Plate Co., New Haven, Conn.
Westline Products Div. of Western Lithograph Co., Los Angeles, Calif.
Wilmington Plastics Co., Wilmington, Del.
Zaco Labs., Div. of Zip Abrasive Co., Cleveland, O.

IMMERSION THERMOSTATS

See Thermostats, Immersion

INCINERATORS, FOR LARGE BUILDINGS

Canton Stoker Corp., Canton, O.
Flynn & Emrich Co., Baltimore, Md. (stoker type)

Gober Incinerator Corp., Blue Island, Ill.
Harmond Company, Cleveland, O.
Incinerator Products, Inc., Detroit, Mich.
Morse Boulger Destructor Co., New York, N. Y.
Plibrico Co., Chicago, Ill.
Syrall Mfg. Co., Syracuse, N. Y.

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Davis Regulator Co., Chicago, Ill.
Daytronic Corp., Dayton, O.
Dickson Co., The, Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hastings-Raydist, Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Mason-Neilan Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Scientific Instrument Co., Detroit, Mich.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
United States Gauge Div. of American Ma-
Weston Elecurical Instrument Corp., A Sub-
chine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
sidiary of Daystrom, Inc., Newark, N. J.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Serdex, Inc., Boston, Mass.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

INDICATOR-CONTROLLERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Assembly Products, Inc., Chesterland, O.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Century Instrument Co., Detroit, Mich.
Cybertronic Corp. of America, Chester, Pa.
Defender Instrument & Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Fenwal Inc., Ashland, Mass.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Garden City Instruments, Inc., Chicago, Ill.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Testing Laboratories, Inc., Chicago.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Partlow Corp., The, New Hartford, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Serdex, Inc., Boston, Mass.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thermo Electric Co., Inc., Saddle Brook, N. J.
Thwing-Albert Instrument Co., Philadelphia.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For Portable CO_2 Analyzers, See Analyzers, Carbon Dioxide, Portable

Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Defender Instrument and Regulator Co., Boody, Ill.
Engelhard, Inc., Chas., East Newark, N. J.
General Scientific Equipment Co., Philadelphia, Pa.
Hays Corp., Michigan City, Ind.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Uehling Instrument Co., Paterson, N. J.

INDICATORS, DEW POINT

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co.. Foxboro, Mass.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Pittsburgh Lectrodryer Co., Pittsburgh, Pa.

INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL, BOILER AND TANK

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Engelhard, Inc., Charles, East Newark, N. J.
Ernst Water Column & Gauge Co., Livingston, N. J.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan Div. of Worthington Corp., Norwood, Mass.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
New York Air Valve Corp., Brooklyn, N. Y.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Petrometer Corp., Long Island City, N. Y.
Phillips & Co., H. A., Chicago, Ill.
Reliance Gauge Column Co., Cleveland, O.
Ripley Co., Inc., Middletown, Conn.
Simplex Valve & Meter Co., Lancaster, Pa.
Swift Lubricator Co., Inc., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Worner Electronic Devices, Rankin, Ill.
Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, pH

American Instrument Co., Inc., Silver Spring, Md.
Analytical Measurements, Inc., Chatham, N. J.
Berna Corp., Garwood, N. J.
Bristol Co., The, Waterbury, Conn.
Calgon Co., Pittsburgh, Pa.
Ernst Water Column & Gauge Co., Livingston, N. J.
Foxboro Co., Foxboro, Mass.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Thomas Co., Arthur H., Philadelphia, Pa.
Wallace & Tiernan Inc., Belleville, N. J.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Will Corp., Rochester, N. Y.

INDICATORS, RELATIVE HUMIDITY

Abbeon Supply Co., Jamaica, N. Y.
Airguide Instrument Co., Chicago, Ill.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Instrument Co., Inc., Silver Spring, Md.
Beckman & Whitley, Inc., San Carlos, Calif.
El-Tronics, Inc., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Serdex, Inc., Boston, Mass.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Walton Laboratories, Inc., Irvington, N. J.
Weighing & Control Component, Inc., Hatboro, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

INDICATORS, SMOKE

Brooke Engineering Co., Philadelphia, Pa.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Edwards, L. V., Rockville Center, N. Y.
Photobell Co., Inc., New York, N. Y.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Worner Electronic Devices, Rankin, Ill.

INDICATORS, SOUND LEVEL

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Hermon Hosmer Scott, Inc., Maynard, Mass.
Mine Safety Appliances Co., Pittsburgh, Pa.
Simpson Electric Co., Chicago, Ill.

INDICATORS, SPECIFIC GRAVITY, REMOTE READING

Hays Corp., The, Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Petrometer Corp., Long Island City, N. Y.

INDICATORS, VALVE POSITION

Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Milford, Conn.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Fairbanks Co., The, New York, N. Y.
Sostman & Co., H. E., Cranford, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Tejax Engineering Corp., Pawtucket, R. I.

INDIRECT HEATING SURFACE

See Surface, Finned, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUCED DRAFT FANS

See Fans, Mechanical Draft, for Boilers

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INJECTOR RECIRCULATORS FOR REFRIGERANTS

Phillips & Co., H. A., Chicago, Ill.

INSERTS, CONCRETE

Air-Path Products Co., Baltimore, Md.
Carpenter & Paterson, Inc., Cambridge, Mass.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Globe Products, Huppower Div., Hupp Corp., Detroit, Mich.
Grabler Mfg. Co., Cleveland, O.
Healy Ruff Co., St. Paul, Minn.
Hilti Rapid Fastening Systems, Inc., New York, N. Y.
Industrial Tubular Equipment Co., North Hollywood, Calif.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Modern Hanger Corp., The, Cleveland, O.
Mult-A-Frame Div., Ainsworth Mfg. Corp., Detroit, Mich.
Phillips Drill Co., Michigan City, Ind.
Rockwood Sprinkler Co., Worcester, Mass.
South Chester Corp., Southco Div., Lester, Pa.
Steel City Electric Co., Pittsburgh, Pa.
Truscon Steel Div., Republic Steel Corp., Youngstown, O.
Unistrut Products Co., Chicago, Ill.

INSERTS, METAL FOR PLASTIC PIPE

Union Malleable Mfg. Co., Ashland, O.

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSTRUMENTS, SOLAR SENSING, FOR HEATING AND AIR CONDITIONING

Johnson Service Co., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.

INSULATING CONCRETE

See Concrete, Insulating

INSULATION ANCHORS AND ADHESIVES

See Fasteners, Insulation

INSULATION, BOILER, TANK, AND EQUIPMENT

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Asbestos Asphalt Insulation Co., Chicago, Ill.
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J., (mineral wool blankets, monoblock, super powerhouse cement, #1 cement)
Bigelow Liptak Corp., Detroit, Mich.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
Fibreboard Paper Products Corp., San Francisco, Calif.
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (industrial rock wool reinforced with wire)
Keasbey & Mattison Co., Ambler, Pa.
L.O.F. Glass Fibers Co., Toledo, O.
Lockport Mills, Inc., Lockport, N. Y.
MMM, Inc., Portsmouth, O. (low temperature)
Monsanto Chemical Co., St. Louis, Mo. (silica aerogel)
Moore Products Co., Philadelphia, Pa.
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
Nicolet Industries, Inc., Hamilton, O. (asbestos)
Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa. (Asbestos and magnesia)
North American Asbestos Corp., Chicago, Ill.
Owens-Corning Fiberglas Corp., Toledo, O. (block or board)
Pacific Lumber Co., The, San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif. (cork, hair felt)
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plibrico Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O. (mineral wool)
Quigley Co., Inc., New York, N. Y.
Rector Mineral Trading Corp., New York, N. Y.
Reflectal Corp. Subsidiary, Borg-Warner Corp., Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y. (Blanket, block, cement)
Robinson Industries, Coleman, Mich. (expanded plastic)
Ruberoid Co., New York, N. Y. (Asbestos, calsilite)
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Thermo-Sound Products, Div. of Kittell-Lacy, Inc., El Monte, Calif.
United Cork Co., Kearney, N. J. (Cork)
United States Mineral Wool Co., Stanhope, N. J. (loose wool)
Walker Jamar Co., Duluth, Minn.
Zonolite Co., Chicago, Ill. (plastic)

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
Alumiseal Corp., New York, N. Y. (reflective)
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibre board, rigid foamed plastic board)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (spun mineral wool blankets)
Barrett Div., **Allied Chemical & Dye Corp.,** New York, N. Y. (Rock wool loose, batts)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Rock wool)
Carney Co., Inc., **The, Mankato, Minn.**
Celotex Corp., The, Chicago, Ill. (flexible, semi-rigid, and rigid)
Chamberlin Co. **of America, Detroit, Mich.**
Dow Chemical Co., The, Midland, Mich.
Dyfoam Corp., Newcastle, Pa.
Eagle-Picher Co., Cincinnati, O. (Loose, fill, batt and granulated)
Flintkote Co., The, New York, N. Y.
Forty-Eight Insulations, Inc., Aurora, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Infra Insulation, Inc., New York, N. Y. (reflective accordion, also asbestos)
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (wood fibre)
International Vermiculite Co., Girard, Ill. (Loose fill)
Johns-Manville, New York, N. Y.
Johnston Foil Mfg. Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
Kaylo Div., Owens-Illinois Glass Co., Toledo, O. (block type)
L.O.F. Glass Fibers Co., Toledo, O.
Lockport Mills, Inc., Lockport, N. Y.
Mearlcrete Div., Mearl Mfg. Corp., Roselle Park, N. J. (roof fill, floor fill, perimeter)
Minnesota & Ontario Paper Co., Minneapolis, Minn.
Miracle Adhesives Corp., Bellmore, N. Y. (vapor barrier material and insulation)
Munn & Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y. (perimeter insulation)
Nelson Mfg. Co., B. F., Minneapolis, Minn.
North American Asbestos Corp., Chicago, Ill.
Owens-Corning Fiberglas Corp., Toledo, O. (batts or blankets)
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
Poe Co., C. W., Cleveland, O. (mineral wool)
Rector Mineral Trading Corp., New York, N. Y.
Reflectal Corp. Subsid., Borg-Warner Corp., Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y. (foil)
Reynolds Metals Co., Louisville, Ky.
Rubatex Div., Great American Industries, Inc., Bedford, Va. (low temperature)
Ruberoid Co., New York, N. Y.
Schlegel Mfg. Co., Rochester, N. Y. (for weather-stripping doors & windows)
Silvercote Products, Inc., Chicago, Ill.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
Star Woolen Co., Cohoes, N. Y.
Tennessee Products and Chemical Corp., Nashville, Tenn.
United Cork Companies, Kearny, N. J. (Cork)
United States Gypsum Co., **Chicago, Ill.** (Wool and USG Ins. board)
United States Mineral Wool Co., Stanhope, N. J. (Mineral wool, granulated wool, loose wool)
United States Pipe & Foundry Co., Birmingham, Ala. (mineral wool-batts and pellets)
Wilson & Co., Inc., Chicago, Ill. (Board)
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Chicago, Ill. (Loose fill)

INSULATION, DUCT, SOUND DEADENING

For Application Inside Duct

American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Asbestos Asphalt Insulation Co., Chicago, Ill.
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J.
Celotex Corp., The, Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Company, The, Boston, Mass. (wool felt)

Grant Wilson, Inc., Chicago, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn. (wood fibre)
Inter-Coastal Paint Corp., East St. Louis, Ill.
Johns-Manville, New York, N. Y. (mineral wool)
Keasbey & Mattison Co., Ambler, Pa.
L.O.F. Glass Fibers Co., Toledo, O.
Lockport Mills, Inc., Lockport, N. Y.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Mortell Co., J. W., Kankakee, Ill.
Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa.
Owens-Corning Fiberglas Corp., Toledo, O. (flexible or board)
Rector Mineral Trading Corp., New York, N. Y.
Silvercote Products, Inc., Chicago, Ill.
Sprayo-Flake Co., Chicago, Ill.
Thompson and Co., Oakmont, Pa.
United States Rubber Co., New York, N. Y.
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
American Flange & Mfg. Co., Inc., New York, N. Y.
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard)
Asbestos Asphalt Insulation Co., Chicago, Ill.
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (semi-rigid mineral wool)
Bigelow Liptak Corp., Detroit, Mich.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos)
Celotex Corp., The, Chicago, Ill.
Dow Chemical Co., The, Midland, Mich.
Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
Felters Company, The, Boston, Mass. (Wool felt)
Flintkote Co., The, New York, N. Y. (fibrated, asphalt spray on)
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson, Inc., Chicago, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Hinde & Dauch Paper Co., Sandusky, O.
Hunter Mfg. Co., Aluminum Insulation Div., Bristol, Pa. (aluminum)
Infra Insulation, Inc., New York, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
Insul-Mastic Corp. of America, Summit, Ill.
International Vermiculite Co., Girard, Ill. (Block)
Johns-Manville, New York, N. Y. (Mineral wool)
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
L.O.F. Glass Fibers Co., Toledo, O.
Lockport Mills, Inc., Lockport, N. Y.
Lynch Asbestos Co., Los Angeles, Calif. (asbestos & foil aircells)
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Miracle Adhesives Corp., Bellmore, N. Y. **(prefabricated polyvinyl duct covering)**
Mortell Co., J. W., Kankakee, Ill.
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
Nicolet Industries, Inc., Hamilton, O. (asbestos)
Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa. (Asbestos and wool felt)
Owens-Corning Fiberglas Corp., Toledo, O. (Blanket or board)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O. (mineral wool)
Quigley Co., Inc., New York, N. Y.
Rector Mineral Trading Corp., New York, N. Y.
Reflectal Corp. Subsid., Borg-Warner Corp., **Chicago, Ill.**
Refractory & Insulation Corp., New York, N. Y. (Mineral wool blanket)
Reynolds Metals Co., Louisville, Ky.
Rubatex Div., Great American Industries, Inc., Bedford, Va. (rubber)
Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
Silvercote Products, Inc., Chicago, Ill.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell type)
Sprayo-Flake Co., Chicago, Ill.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
Star Woolen Co., Cohoes, N. Y.
Taft Jenkins Co., Inc., Holyoke, Mass.
Thermo-Sound Products, Div. of Kittell-Lacy, Inc., El Monte, Calif. (blanket type)
United Cork Companies, Kearny, N. J. (Cork)
United States Mineral Wool Co., Stanhope, N. J.
Wilson & Co., Inc., Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

INSULATION FASTENERS AND ANCHORS

See Fasteners, Insulation

INSULATION, FINISHING CEMENT

Baldwin-Hill Co., Trenton, N. J.
Bigelow Liptak Corp., Detroit, Mich.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (calcium silicate)
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson, Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Moore Inc., Goodloe E., Danville, Ill.
Mundet Cork Corp., N. Bergen, N. J. (mineral wool)
Nicolet Industries, Inc., Hamilton, O. (asbestos)
North American Asbestos Corp., Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Ruberoid Co., New York, N. Y. (asbestos)
St. Clair Rubber Co., Detroit, Mich.
Standard Asbestos Mfg. Co., Chicago, Ill.
United States Mineral Wool Co., Stanhope, N. J.

INSULATION, PIPE, AND TUBING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (magnesia)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa. (Cork, flexible foamed plastic)
Asbestos Asphalt Insulation Co., Chicago, Ill.
Atlas Mineral Products Co., Mertztown, Pa.
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (mineral wool; #100 pipe covering, 85% magnesia pipe covering, calcium silicate pipe covering)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos, magnesia)
Dow Chemical Co., The, Midland, Mich.
Eagle-Picher Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (magnesia)
Fibreboard Paper Products Corp., San Francisco, Calif.
Forty-Eight Insulations, Inc., Aurora, Ill.
Glo-Brite Products, Inc., Chicago, Ill.
Grant Wilson, Inc., Chicago, Ill. (85% magnesium, **air-cell, woolfelt, anti-sweat, frost proof, sponge felt.)**
Gustin-Bacon Mfg. Co., Kansas City, Mo. (Molded fine glass fiber)
Hunter Mfg. Co., Aluminum Insulation Div., Bristol, Pa. (reflective)
Industrial Laminates Div., Fabric Distributing Co., New York, N. Y.
Infra Insulation, Inc., New York, N. Y.
Insul-Mastic Corp. of America, Summit, Ill. (asphalt-cork)
International Vermiculite Co., Girard, Ill.
Jarrow Products, Inc., Chicago, Ill. (sponge tubing)
Johns-Manville, New York, N. Y.
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork) (hair felt on cold side)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
L.O.F. Glass Fibers Co., Toledo, O.
Lockport Mills, Inc., Lockport, N. Y.
MMM, Inc., Portsmouth, O. (low temperature)
Met-L-Wood Corp., Chicago, Ill. (composition material faced with sheet metal)
Minnesota Mining & Mfg. Co., St. Paul, Minn. (Spray)
Miracle Adhesives Corp., Bellmore, N. Y. (prefabricated polyvinyl pipe insulation and finish)
Mortell Co., J. W., Kankakee, Ill. (plastic cork)
Mundet Cork Corp., North Bergen, N. J. (85% magnesia, calcium silicate, 100% pure cork)
Munn and Steele, Inc., South Boston, Mass.
Mystik Adhesive Products, Inc., Chicago, Ill.
National Cork Co., Englewood, N. J. (Corkboard)
Nicolet Industries, Inc., Hamilton, O. (Asbestos)
Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa. (Asbestos, magnesia)
North American Asbestos Corp., Chicago, Ill.
Owens-Corning Fiberglas Corp., Toledo, O. (performer or flexible)
Pacific States Felt Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O. (mineral wool)
Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo. (tape)
Rector Mineral Trading Corp., New York, N. Y.
Reflectal Corp. Subsid., Borg-Warner Corp., **Chicago, Ill (foil and corrugated paper)**
Rhopac, Inc., Skokie, Ill.
Robinson Industries, Coleman, Mich. (expanded plastic)
Rubatex Div., Great American Industries, Inc., Bedford, Va. (rubber)
Ruberoid Co., New York, N. Y. (Asbestos, calsilite)
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell, wool felt and hair felt)
Sponge Products Div., B. F. Goodrich Co., Shelton, Conn. (cellular rubber)
Spring Packing Corp., Chicago, Ill. (asphaltic)
Standard Asbestos Mfg. Co., Chicago, Ill.
Surface Chemicals, Inc., McKees Rock, Pa.
Taft Jenkins Co., Inc., Holyoke, Mass.
United Cork Companies, Kearny, N. J.
Walker Jamar Co., Duluth, Minn.
Wilson & Co., Chicago, Ill. (hairfelt)
Wood Conversion Co., St. Paul, Minn.
Wrap-On Co., Chicago, Ill. (Glass fiber and flexible tape)

INSULATION, PIPE, UNDERGROUND

American Gilsonite Co., Salt Lake City, Utah
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Durant Insulated Pipe Co., E. Palo Alto, Calif.
Durant Insulated Pipe Co., Inc., Williamstown, N. J.
Insul-Fil Co., Inc., Div. Miracle Adhesives Corp., Bellmore, Long Island, N. Y.
Mearlcrete Div., Mearl Mfg. Corp., Roselle Park, N. J.
Owens-Corning Fiberglas Corp., Toledo, O.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Porter & Co., Inc., H. W., Newark, N. J.
Ric-wiL, Inc., Barberton, O. (hot or cold)
Temploc, Inc., Baldwin Park, Calif.
Ziegler & Co., G. S., Great Neck, N. Y.
Zonolite Co., Chicago, Ill.

INTAKES FOR OUTDOOR AIR, WALL OR ROOF, EQUIPPED WITH FILTERS

Atmos Corp., Chicago, Ill.

IONIZATION APPARATUS
Dryomatic Corp., Alexandria, Va.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Ionaire, Inc., San Francisco, Calif.
Montgomery Bros., San Francisco, Calif.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.
Wesix Electric Heater Co., San Francisco, Calif.

IRON BODY VALVES
See Valves, Gate; and Valves, Globe

ISOTOPES, RADIOACTIVE, FOR DETECTING LEAKS IN PIPING AND HEATING SYSTEMS
American Gas & Chemicals, Inc., Leak-Tec Div., New York, N. Y.
Tracerlab, Inc., Waltham, Mass.

JACKETED PIPE
See Pipe, Jacketed

JACKETING FOR PIPE INSULATION
See Protectors, Pipe Covering

JETS, OVERFIRE AIR, FOR SMOKE ABATEMENT
Canton Stoker Corp., Canton, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
McNeill Smoke Eliminator Co., Chicago, Ill.
North American Mfg. Co., Cleveland, O.
Sterns-Flinn Corp., New York, N. Y.

JOINTS, PIPE, ELECTRICAL INSULATING
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Universal Controls Corp., Dallas, Tex.

JOINTS, PIPE, EXPANSION, FOR BASEBOARD HEATING
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Cook Electric Co., Chicago, Ill.
Flexonics Corp., Maywood, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Nibco, Inc., Elkhart, Ind.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
Webster & Co., Warren, Camden, N. J.

JOINTS, PIPE, EXPANSION, PACKLESS, METAL
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
American Boa, Inc., New York, N. Y.
American Flow Control Corp., Houston, Tex.
Badger Fire Extinguisher Co., Methuen, Mass.
Badger Mfg. Co., Cambridge, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Cook Electric Co., Chicago, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Finn & Co., Inc., T. R., Hawthorne, N. J.
Flexonics Corp., Maywood, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Marquette Coppersmithing Co., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ric-wiL, Inc., Barberton, O.
Rotherm Engineering Co., Inc., Chicago, Ill.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Solar Aircraft Co., San Diego, Calif.
Techniflex Corp., Port Jervis, N. Y.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
Zallea Brothers, Wilmington, Del.

JOINTS, PIPE, EXPANSION, PACKLESS, RUBBER
American Flow Control Corp., Houston, Tex.
Garlock Packing Co., Palmyra, N. Y. (spool type & U type)
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Saussé & Co., M. W., Los Angeles, Calif.
United States Rubber Co., New York, N. Y.
Vibration Mountings, Inc., Corona, Ill.

JOINTS, PIPE, EXPANSION, SLIP
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
American Flow Control Corp., Houston, Tex.
Badger Fire Extinguisher Co., Methuen, Mass.
Baker & Co., R. H., Los Angeles, Calif.
Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Heating Equipment Co., Detroit, Mich.
Moran Flexible Joint Co., Div. of Railroad Products Co., Cincinnati, O.
Multiplex Mfg. Co., Berwick, Pa.
Nibco, Inc., Elkhart, Ind.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Powell Co., Wm., Cincinnati, O.
Q-P Mfg. Co., Needham Heights, Mass.
Rotherm Engineering Co., Inc., Chicago, Ill.
Royalton Co., Inc., Gasport, N. Y.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Tube Turns Plastics, Inc., Louisville, Ky. (injection molded PVC)
United States Gasket Co., Camden, N. J.
Walworth Co., New York, N. Y.
Webster & Co., Warren, Camden, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE, SWING AND REVOLVING
Barco Mfg. Co., Barrington, Ill.
Bordo Co., Inc., L. J., Glenside, Pa.
Chiksan Co., Brea, Calif.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Finn & Co., Inc., T. R., Hawthorne, N. J.
Flexo Supply Co., Inc., St. Louis, Mo.
Johnson Corp., The, Three Rivers, Mich.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Mayson Mfg. Co., Detroit, Mich.
Moran Flexible Joint Co., Div. of Railroad Products Co., Cincinnati, O.
OPW Corp., Cincinnati, O.
Perfecting Service Co., Charlotte, N. C.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Powell Co., Wm., Cincinnati, O.
Rotherm Engineering Co., Inc., Chicago, Ill.
Sealol Corp., Providence, R. I.
Seamlex Co., Inc., Long Island City, N. Y.
Spincraft, Inc., Milwaukee, Wis.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

JOINTS, UNIVERSAL, FOR OPERATING VALVES
Blood Brothers Machine Div., Rockwell Spring and Axle Co., Allegan, Mich.
Brooks Equipment Corp., Hoboken, N. J.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clark Flexible Link Shaft Co., Newton Highlands, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Piezo Mfg. Corp., Staten Island, N. Y.
Stow Mfg. Co., Binghamton, N. Y.

KATA THERMOMETERS
See Thermometers, Kata

KITS, COMBUSTION TESTING
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
G. M. Mfg. Co., New York, N. Y.
Hays Corp., Michigan City, Ind.
Victory Engineering Corp., Union, N. J.

LACQUERS
See Enamels and Lacquers

LAGGING ADHESIVES
See Adhesives, for Pipe Covering

LAMPS, STERILIZING, FOR DUCT INSTALLATION
Cooper Hewitt Electric Co., Div. of Sperti-Faraday, Inc., Hoboken, N. J.
Fuller Co., D. William, Chicago, Ill.
General Electric Co., Large Lamp Dept., Nela Park, Cleveland, O.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Sampson Scientific Co., Div. of the Sampson Chemical & Pigment Corp., Chicago, Ill.
Sperti Faraday, Inc., Hoboken, N. J.
Westinghouse Electric Corp., Lamp Div., Bloomfield, N. J.

LEAD PIPE
See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS
See Sheets, Lead

LEAD TUBING
See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS
See Detectors, Leak, Refrigerant; Detectors, Leak, Underground Piping; Isotopes, Radioactive

LEATHER PACKING
See Packing, Leather

LIFT GATES AND LIFT TRUCKS
See Gates, Lift; Trucks, Lift

LIGHTS, PILOT AND SIGNAL
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
General Electric Co., Large Lamp Dept., Nela Park, Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Hubbell Corp., Mundelein, Ill. (for solenoid valves)
Kulka Electric Mfg. Co., Inc., Mt. Vernon, N. Y.
Pyle-National Co., The, Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Signal Indicator Corp., Brooklyn, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

LININGS, TANK
Amercoat Corp., South Gate, Calif.
Atlas Mineral Products Co., Mertztown, Pa.
Carboline Co., The, St. Louis, Mo.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (plastic)
Corite Products, Inc., Chicago, Ill. (plastic)
Corrosion Control Co., Inc., New York, N. Y.
Elastic Porcelain Lining Corp., Rochester, N. Y.
Ellicott Fabricators, Inc., Baltimore, Md.
Garlock Packing Co., Palmyra, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Industrial Products Co., B. F., Akron, O.
Heil Process Equipment Corp., Cleveland, O.
Heresite & Chemical Co., Manitowoc, Wis. (Phenolic baking type; synthetic rubber, sheet and liquid)
Industrial Filter & Pump Co., Chicago, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Kaykor Industries, Inc., Yardville, N. J.
Knapp Mills, Inc., Long Island City, N. Y. (lead)
Knight, Maurice A., Akron, O.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Lithcote Corp., Melrose Park, Ill.
Metal & Thermit Corp., Rahway, N. J.
Nazar Rubber Co., Toledo, O.
Norwood Associated Engineers, Inc., Springfield, Mass.
Patterson-Kelley Co., Inc., The, E. Stroudsburg, Pa. (cement)
Porce-Lin Tank Lining Co., Detroit, Mich.
Steelcote Mfg. Co., St. Louis, Mo.
United States Rubber Co., New York, N. Y.
Wilbur & Williams Co., Brighton, Mass. (acid caustic band tank lining system)

LINKS, FUSIBLE

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Register Corp., Cedar Grove, N. J.
Grinnell Co., Inc., Providence, R. I.
Hodgman Mfg. Co., Inc., Taunton, Mass.
Morse-Smith-Morse Co., Watertown, Mass.
Parish Co., New Orleans, La.
Preferred Utilities Mfg. Corp., New York, N. Y.

LIQUID LEVEL GAGES

See Gages, Liquid Level

LIQUID LEVEL INDICATORS

See Indicators, Liquid Level

LIQUID LEVEL RECORDERS

See Recorders, Liquid Level

LIQUID LEVEL REGULATORS

See Regulators, Liquid Level

LIQUID PRESSURE REGULATORS

See Regulators, Pressure, Liquid

LOCATORS, PIPE, UNDERGROUND

Fisher Research Laboratory, Inc., Palo Alto, Calif.
Wilkinson Products Co., Pasadena, Calif.

LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

LOCK NUTS

See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Conditioning Engineering Co., Cambridge, Mass.
Air Conditioning Products Co., Detroit, Mich.
Airjet Ventilator Co., San Clemente, Calif.
Airmaster Corp., Chicago, Ill.
Air-Path Products Co., Baltimore, Md.
Air & Refrigeration Corp., New York, N. Y.
Allen Cooler & Ventilator, Inc., Rochester, Mich.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Metal Works, Inc., New Orleans, La.
American Steel Band Co., Pittsburgh, Pa.
American Warming & Ventilating Co., Toledo, O.
Ammerman Co., Inc., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Atmos Corp., Chicago, Ill.
Belco Industries, Inc., St. Louis, Mo.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brisk Metal Products, New York, N. Y.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
Cain Mfg. Co., Birmingham, Ala.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Colt Ventilation Co. of America, Inc., Los Angeles, Calif.
Commercialaire Corp. of America, Brooklyn, N. Y.
Controlair Mfg. Co., Los Angeles, Calif.
Cook Co., Loren, Berea, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Detroit Float & Stamping Co., Detroit, Mich.
Dual-Air Fan Co., Hampshire, Ill.
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Frigid, Inc., Brooklyn, N. Y.
General Blower Co., Morton Grove, Ill.
Hunter Div., Robbins & Myers, Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
Imperial Damper Co., New York, N. Y.
Independent Register Co., Cleveland, O.
International Engineering, Inc., Dayton, O.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Lemlar Mfg. Co., Gardena, Calif.
Maple City Furnace Co., Monmouth, Ill.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Muckle Mfg. Co., Owatonna, Minn.
Murray Co. of Texas, The, Atlanta, Ga.
Peerless Electric Co., Warren, O.
Reed Unit-Fans, Inc., New Orleans, La.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Rittling Corp., The, Buffalo, N. Y.
Robertson Co., H. H., Pittsburgh, Pa.
Signal Electric Div. of King-Seeley Corp., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Standard Stamping & Perforating Co., Chicago, Ill.
Swartwout Co., The, Cleveland, O.
Thermotank, Inc., Products Div., Detroit, Mich.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
United Sheet Metal Co., Inc., Columbus, O.
United States Gypsum Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
Uno Ventilator Co., Malden, Mass.
Van Noorden Co., E., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

LOUVERS, SUN REFLECTING

American Warming & Ventilating Co., Toledo, O.
Atmos Corp., Chicago, Ill.
Kewaneer Co., Niles, Mich.
Lemlar Mfg. Co., Gardena, Calif.

LOW WATER CUT-OFFS

See Cut-offs, Low Water, Heating Boiler

LUBRICANTS, VALVE STEM

Armite Laboratories, Los Angeles, Calif.
Electrofilm, Inc., N. Hollywood, Calif.
Fluidwick Co., Detroit, Mich.
Gulf Oil Corp., Pittsburgh, Pa.
Jet-Lube, Inc., Burbank, Calif.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.

MACHINES, BALANCING

See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT

For Reproducing Engineering Drawings

American Photocopy Equipment Co., Chicago, Ill. (for photocopy work)
Bruning Co., Inc., Charles, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Drying Systems Co., Chicago, Ill.
Ozalid Div. of General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.

MACHINES AND FILM, X-RAY

Balteau Electric Corp., Stamford, Conn.
du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington, Del. (film only)
Eastman Kodak Co., Rochester, N. Y.
Keleket X-Ray Corp., Waltham, Mass.
Mitchell Radiation Products Corp., Norristown, Pa.
North American Philips Co., Inc., Mt. Vernon, N. Y.
Picker X-Ray Co., White Plains, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

MACHINES, FLARING, PIPE AND TUBE

Chicago Pneumatic Tool Co., New York, N. Y.
Hill, Inc., Walter P., Detroit, Mich.
Leonard Precision Products Co., Santa Ana, Calif.
Wilson Co., K. R., Arcade, N. Y.

MACHINES, PIPE CLEANING

Continental Machine Co., Chicago, Ill.
Fennelly Co., J. C., San Francisco, Calif.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Spartan Tool Co., Chicago, Ill.
Wilson, Inc., Thomas C., Long Island City, N. Y.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE

Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Collins Machinery Corp., Los Angeles, Calif.
Continental Machine Co., Chicago, Ill.
H & M Pipe Beveling Machine Co., Tulsa, Okla.
Kalamazoo Tank & Silo Co., Machine Tool Div., Kalamazoo, Mich.
Landis Machine Co., Inc., Waynesboro, Pa.
Muncie Gear Wks., Inc., Muncie, Ind.
Obear & Son, W. F., Inglewood, Calif.
Oster Mfg. Co., Cleveland, O.
Pilot Mfg. Co., Torrance, Calif.
Ridge Tool Co., Elyria, O.
Thread-Ezy Mfg. Co., Corunna, Mich.
Toledo Pipe Threading Machine Co., Toledo, O.
Velocity Power Tool Co., Div. of Mine Safety Appliances Co., Pittsburgh, Pa.
Wachs Co., E. H., The, Chicago, Ill.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY

Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Collins Machinery Corp., Los Angeles, Calif.
Continental Machine Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa.
Obear & Son, W. F., Inglewood, Calif.
Oster Mfg. Co., Cleveland, O.
Pilot Mfg. Co., Torrance, Calif.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Stratford Pipe Scalloper Co., Clearwater, Fla.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PITTSBURGH LOCK FORMING

Bell Machine Specialties, Trevose, Pa.
Birks Mfg. Co., Meridan, Conn. (Pittsburgh lock seam opener)
Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.
Milton Equipment Co., Philadelphia, Pa. (sheet metal working machine)
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Port City Machine & Tool Co., Muskegon, Mich.
Speed-Seam Co., Chicago, Ill.

MACHINES, REFRIGERATION, ABSORPTION

Arkla Air Conditioning Corp., Evansville, Ind.
Carrier Corp., Syracuse, N. Y.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

MACHINES, SLIP ROLL FORMING

Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Bertsch & Co., Inc., Cambridge City, Ind.
Hendley & Whitmore Co., Beloit, Wis.
Maplewood Machinery Co., Inc., Chicago, Ill.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
San Angelo Foundry & Machine Co., San Angelo, Tex.
Webb Corp., The, Webb City, Mo.
Wysong & Miles, Inc., Greensboro, N. C.

MACHINES, TESTING, WELD

Air Reduction Co., Inc., New York, N. Y.
Dillon & Co., Inc., W. C., Van Nuys, Calif.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

MACHINES, TRENCHING, FOR PIPE LINES

Auburn Machine Works, Inc., Auburn, Nebr.
Clipper Mfg. Co., Kansas City, Mo.
Parsons Co., Div. of Koehring Co., Newton, Ia.

MACHINES, TUBE FINNING

United Machinery Sales Co., Chicago, Ill.

MAGNESIUM ALLOY SHEETS

See Sheets, Magnesium Alloy

MAGNESIUM TUBING

See Tubing, Magnesium

MALLEABLE UNIONS

See Unions, Malleable

MANIFOLDS AND HEADERS, PREFABRICATED, FOR HEATING SYSTEMS

Acheson Mfg. Co., Rankin, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Grinnell Co., Inc., Providence, R. I
Hi-Flow Products, Inc., Copiague, N. Y.
Kenmore Machine Products, Inc., Lyons, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
Shaw-Kendall Engineering Co., Toledo, O.
Super Radiator Corp., Minneapolis, Minn.
Thrush & Co., H. A., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

MANIFOLDS, REFRIGERATION

Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kenmore Machine Products, Inc., Lyons, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Research, Inc., Brighton, Mich.
Super Radiator Corp., Minneapolis, Minn.
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

MANOMETERS

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Meter Co., Inc., Philadelphia, Pa.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Defender Instrument and Regulator Co., Boody, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Elgin Softener Corp., Elgin, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Flow Corp., Arlington, Mass. (micro)
Hastings-Raydist, Inc., Hampton, Va.
Hill & Co., E. Vernon, Lake Geneva, Wis.
King Engineering Corp., Ann Arbor, Mich.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
National Inst. Labs. Inc., Riverdale, Md.
Norwalk Valve Co., South Norwalk, Conn.
Scientific Instrument Co., Detroit, Mich.
Simplex Valve & Meter Co., Lancaster, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Wallace & Tiernan Inc., Belleville, N. J.
Will Corp., Rochester, N. Y.

MARKERS, PIPE, HOLE AND SADDLE

Brady Co., W. H., Milwaukee, Wis.
Contour Marker Corp., Compton, Calif.
Jewel Mfg. Co., St. Paul, Minn.
Seton Name Plate Co., New Haven, Conn.

MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Flexible, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

Chemiquip Co., New York, N. Y.
Keystone Carbon Co., Inc., St. Marys, Pa.
Moraine Products Div., General Motors Corp., Dayton, O.
Newark Wire Cloth Co., Newark, N. J.
Wabash Corp., Chicago, Ill.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METER MANIFOLD ASSEMBLIES

See Assemblies, Manifold, for Meters

METERS, AIR VELOCITY, DIRECT READING

Anemostat Corp. of America, New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Flow Corp., Arlington, Mass.
Hastings-Raydist, Inc., Hampton, Va.
Illinois Testing Laboratories, Inc., Chicago.

METERS, BTU, FOR MEASURING FLOW AND TEMPERATURE AND CALIBRATED IN BTU OR THERMS

Air-Conditioning Equipment Corp., New York, N. Y.
American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.

METERS, CONDENSATE

Central Station Steam Co., Detroit, Mich.
Hays Corp., Michigan City, Ind.
Henszey Co., Watertown, Wis.
Neptune Meter Co., New York, N. Y.

METERS, FLOW, GAS OR AIR

American Meter Co., Inc., Philadelphia, Pa.
Aquatrol Ferr-X Corp., Clifton, N. J.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Fischer & Porter Co, Hatboro, Pa.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hastings-Raydist, Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Industrial Development Laboratories, Inc., Jersey City, N. J.
King Engineering Corp., Ann Arbor, Mich.
Librascope, Inc., Commercial Div., Burbank, Calif.
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
National Instrument Laboratories, Inc., Riverdale, Md.
Neptune Meter Co., New York, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Selas Corp. of America, Dresher, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Vector Mfg. Co., Inc., Jenkintown, Pa.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.

METERS, FLOW, REFRIGERANT

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Landsdale, Pa.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Industrial Development Laboratories, Inc., Jersey City, N. J.
Neptune Meter Co., New York, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Trimount Instrument Co., Chicago, Ill.

METERS, FLOW, STEAM

American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Henszey Co., Watertown, Wis.
King Engineering Corp., Ann Arbor, Mich.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
National Instrument Laboratories, Inc., Riverdale, Md.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Rotron Controls Corp., Woodstock, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

METERS, PROCESS LIQUID

American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Drage Products, Inc., Union City, N. J.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Granberg Corp., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.

Henszey Co., Watertown, Wis.
Hetherington & Berner, Inc., Indianapolis, Ind. (jacketed)
Mason-Neilan, Div.. of Worthington Corp., Norwood, Mass.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Simplex Valve & Meter Co., Lancaster, Pa.
Smith Corp., A. O., Milwaukee, Wis.
Swartwout Co., The, Cleveland, O.
Trimount Instrument Co., Chicago, Ill.
Worthington-Gamon Meter Div., Worthington Corp., Newark, N. J.

METERS, VOLUME, AIR AND GAS

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Meter Co., Inc., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Granberg Corp., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hastings-Raydist, Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Neptune Meter Co., New York, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Selas Corp. of America, Dresher, Pa.
Simplex Valve & Meter Co., Lancaster, Pa.
Uehling Instrument Co., Paterson, N. J.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.

METERS, WATER

American Moistening Co., Providence, R. I.
Aquatrol Ferr-X Corp., Clifton, N. J.
Brooks Rotameter Co., Lansdale, Pa.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Henszey Co., Watertown, Wis.
Hersey Mfg. Co., Dedham, Mass.
Neptune Meter Co., New York, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Worthington Corp., East Orange, N. J.
Worthington-Gamon Meter Div., Worthington Corp., Newark, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water Modulating

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR-PUMP UNITS

See Pump-Motor Units, Self-Contained

MOTOR STARTERS

See Controllers and Starters, Motor

MOTORS, COMPRESSED AIR POWERED

Binks Mfg. Co., Chicago, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Detroit Hoist & Machine Co., Detroit, Mich.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Leiman Bros., Inc., Newark, N. J.
Powers Regulator Co., Skokie, Ill.

MOTORS, ELECTRIC, FRACTIONAL HP

ACEC Electric Corp., New York, N. Y.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Alliance Mfg. Co., Inc., Alliance, O. (Shaded pole)
Baldor Electric Co., St. Louis, Mo.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Bluffton Electric Co., Bluffton, Ind.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
Century Electric Co., St. Louis, Mo.
Clock & Timer Dept., General Electric Co., Ashland, Mass.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Dayton Electric Mfg. Co., Chicago, Ill.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Doerr Electric Corp., Cedarburg, Wis.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electric Motors & Specialties, Inc., Garrett, Ind.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
Fasco Industries, Inc., Rochester, N. Y.
Franklin Electric Co., Inc., Bluffton, Ind.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hansen Mfg. Co., Inc., Princeton, Ind.
Holtzer-Cabot Electric Motor Div., National Pneumatic Co., Inc., Boston, Mass.
Howard Industries, Inc., Racine, Wis. (all types)
Howell Electric Motors Co., Howell, Mich.
Iron Fireman Mfg. Co., Cleveland, O.
Jack & Heintz, Inc., Cleveland, O.
Kingston-Conley, Inc., Div. of the Ohio Electric Mfg. Co., North Plainfield, N. J.
Kurz & Root Co., Appleton, Wis.
Lamb Electric Co., A Div. of American Machine & Metals, Inc., Kent, O.
Leland Electric Co., The, Div. of American Machine & Foundry Co., Dayton, O.
Lima Electric Motor Co., Inc., The, Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marco Industries, Inc., Womelsdorf, Pa.
Master Electric Co., Dayton, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Co., The, Marceline, Mo., (Slow speed fan motors)
Morrill Motors, Ft. Wayne, Ind.
National Pneumatic Co., Inc., New York, N. Y.
Newman Electric Motors, Inc., Newark, N. J.
Ohio Electric Mfg. Co., The, Maple Heights, O.
Packard Electric Div., General Motors Corp., Warren, O.
Peerless Electric Co., Warren, O.
Portable Electric Tools, Inc., Chicago, Ill.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., River Grove, Ill.
Ripley Co., Inc., Middletown, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Robbins & Myers, Inc., Springfield, O.
Royal Mfg. Corp., Waterloo, Ind.
Small Motors, Inc., Chicago, Ill.
Smith Corp., A. O., Milwaukee, Wis.
Smith Corp., A. O., Electric Motor Div., Tipp City, O.
Speedway Mfg. Co., Div. of Thor Power Tool Co., Chicago (Cicero), Ill.
Sutton Corp., O. A., The, Wichita, Kans.
Thermador Electrical Mfg., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Universal Electric Co., Owosso, Mich.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.

MOTORS, ELECTRIC, 1 HP AND OVER

ACEC Electric Corp., New York, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, The, Milwaukee, Wis.
Baldor Electric Co., St. Louis, Mo.
Bell & Gossett Co., Morton Grove, Ill.
Brook Motor Corp., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
Byron Jackson Pumps, Inc.., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif. (submersible)
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Dayton Electric Mfg. Co., Chicago, Ill.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Doerr Electric Corp., Cedarburg, Wis.
Electric Machinery Mfg. Co., Minneapolis, Minn. (100 hp and over)
Electric Products Co., Cleveland, O.
Electro-Dynamic Div. of General Dynamics Corp., Bayonne, N. J.
Elliott Co., Jeannette, Pa.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hertner Electric Co., The, Cleveland, O.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Kingston-Conley, Inc., Div. of the Ohio Electric Mfg. Co., North Plainfield, N. J.
Leland Electric Co., The, Div. of American Machine & Foundry Co., Dayton, O.
Lima Electric Motor Co., Inc., The, Lima, O.
Lincoln Electric Co., Cleveland, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Corp., Gladstone, Mich.
Master Electric Co., Dayton, O.
Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Newman Electric Motors, Inc., Newark, N. J.
Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Reuland Electric Co., Alhambra, Calif.
Robbins & Myers, Inc., Springfield, O.
Smith Corp., A. O., Milwaukee, Wis.
Smith Corp., A. O., Electric Motor Div., Tipp City, O.
Star-Kimble Electric Co., Div. of Safety Industries, Inc., Hamden, Conn.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.

MOUNTINGS, VIBRATION

See Bases and Pads, Vibration Isolating

MUFFLERS, HOT GAS, FOR REFRIGERANT LINES

Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Dunham-Bush, Inc., West Hartford, Conn.
Industrial Acoustics Co., Inc., New York, N. Y.
McIntire Co., The, Livingston, N. J.
Refrigeration Research, Inc., Brighton, Mich.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.

MUSHROOM HEATERS

See Heaters, Steam Jet, for Liquids

MUSHROOM VENTILATORS
See Ventilators, Mushroom

NAMEPLATES, STOCK WORDING FOR IDENTIFYING HEATING, PIPING AND AIR CONDITIONING EQUIPMENT AND CONTROLS
Atlantic Engravers, Inc., Amityville, N. Y.
Brady Co., W. H., Milwaukee, Wis. (self-bonding)
Metalcraft, Inc., Mason City, Ia.
North Shore Nameplate Inc., Bayside, N. Y.
Pee Cee Tape & Label Co., Los Angeles, Calif.
Seton Name Plate Co., New Haven, Conn.

NEUTRALIZERS, ACID
See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR
See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS
See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS
See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER
Acheson Mfg. Co., Rankin, Pa.
Aeroquip, Inc., Van Wert, O.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Allen Mfg. Co., W. D., Chicago, Ill.
American Sanitary Mfg. Co., Abingdon, Ill.
Anderson Brass Co., Detroit, Mich.
Capitol Mfg. & Supply Co., Columbus, O.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Oak Park, Ill.
Cobra Metal Hose Div., Chicago, Ill.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Mueller Brass Co., Port Huron, Mich.
New York Brass Foundry, New York, N.Y.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Sawhill Tubular Products, Inc., Sharon, Pa.
Span Brass Mfg. Co., Otsego, Mich.
Star Tubular Products Co., Chicago, Ill.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.
Ware Coupling & Nipple Co., Ware, Mass.
Weatherhead Co., Ft. Wayne Div., Ft. Wayne, Ind.
Wheeling Machine Products Co., Wheeling, W. Va.

NIPPLES, PIPE, FLEXIBLE
Cobra Metal Hose Div., Chicago, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Hauck Mfg. Co., Brooklyn, N. Y.
Johnson Metal Hose, Inc., Waterbury, Conn.
Lindy Heaters, Inc., New York, N. Y.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Tube Turns Plastics, Inc., Louisville, Ky. (PVC)
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
United States Rubber Co., New York, N. Y. (rubber)

NIPPLES, PIPE, IRON AND STEEL
Aeroquip, Inc., Van Wert, O.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Albert Pipe Supply Co., Brooklyn, N. Y.
Allen Mfg. Co., W. D., Chicago, Ill.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Capitol Mfg. & Supply Co., Columbus, O.
Chicago Nipple Mfg. Co., Oak Park, Ill.
Clow & Sons, Inc., James B., Chicago, Ill.
Cobra Metal Hose Div., Chicago, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Ladish Co., Cudahy, Wis.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Sawhill Tubular Products, Inc., Sharon, Pa.
Star Tubular Products Co., Chicago, Ill.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ware Coupling & Nipple Co., Ware, Mass.
Wheeling Machine Products Co., Wheeling, W. Va.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY
Camco Products, Inc., North Haven, Conn.
Cobra Metal Hose Div., Chicago, Ill.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Ladish Co., Cudahy, Wis.
Star Stainless Screw Co., Paterson, N. J.
Walworth Co., New York, N. Y.

NIPPLES, PIPE, PLASTIC
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O.
Easton Plastic Products Co., Inc., Easton, Pa. (rigid unplasticized polyvinyl chloride)
Kraloy Plastic Pipe Co., Inc., Los Angeles, Calif.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Sawhill Tubular Products, Inc., Sharon, Pa.
Skyline Industries Sales, Inc., Titusville, Pa.
Sloane Mfg. Co., Sun Valley, Calif.
Star Tubular Products Co., Chicago, Ill.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
Tube Turns Plastics, Inc., Louisville, Ky.
Vanton Pump & Equipment Corp., Hillside, N. J.

NIPPLES, RADIATOR, SLIP AND SCREW
Fanner Mfg. Co., The, Cleveland, O.

NOISE CONTROL IN DUCTS
See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems

NOISE ELIMINATION FOR COOLING TOWERS
Industrial Acoustics Co., Inc., New York, N. Y.
Industrial Sound Control Dept. of Koppers Co., Inc., Metal Products Div., Baltimore, Md.
Mar-Coil Heater Co., Union City, N. J.
Vibration Mountings, Inc., Corona, N. Y.

NOISE ELIMINATORS
See Bases and Pads, Vibration Isolating; Hose, Flexible, Metal and Fittings; Insulation, Duct, Sound Deadening

NOZZLES, ATOMIZING
American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Inc., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Boston Machine Works Co., Lynn, Mass.
Century Engineering Corp., Cedar Rapids, Ia.
Carrier Corp., Syracuse, N. Y.
Delavan Mfg. Co., West Des Moines, Ia.
Eddington Metal Specialty Co., Eddington, Pa.
Engineer Co., New York, N. Y.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Parks Cramer Co., Fitchburg, Mass. (Industrial humidifier)
Ross Sprinkler Co., Rosemead, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spray Engineering Co., Burlington, Mass.
Spraying Systems Co., Bellwood, Ill.
Steinen Mfg. Co., Wm., Newark, N. J.
Supreme Electric Products Corp., Rochester, N. Y.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOODING
American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Binks Mfg. Co., Chicago, Ill.
Delavan Mfg. Co., West Des Moines, Ia.
Spraying Systems Co., Bellwood, Ill.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOW MEASURING
Able Metal Spinning & Stamping Co., Far Rockaway, N. Y.
Bailey Meter Co., Cleveland, O.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I. (open flow, inserts)
Defender Instrument & Regulator Co., Boody, Ill.
Delavan Mfg. Co., West Des Moines, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.

NOZZLES, OIL BURNER
Balloffet Nozzle Co., Inc., Guttenberg, N. J.
Benjamin Air Rifle Co., St. Louis, Mo.
Century Engineering Corp., Cedar Rapids, Ia.
Delavan Mfg. Co., West Des Moines, Ia.
Eddington Metal Specialty Co., Eddington, Pa.
Engineer Co., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Steinen Mfg. Co., Wm., Newark, N. J.

NOZZLES, SPARGER, FOR TANK HEATING
Heil Process Equipment Corp., Cleveland, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.

NOZZLES, SPRAY
Allen Mfg. Co., W. D., Chicago, Ill.
American Cooling Tower Co., Kansas City, Mo.
American Moistening Co., Providence, R. I.
April Showers Co., Inc., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Inc., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Livingston, N. J.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chain Belt Co., Milwaukee, Wis.
Clarage Fan Co., Kalamazoo, Mich.
Delavan Mfg. Co., West Des Moines, Ia.
Duriron Co., Inc., Dayton, O.
Eddington Metal Specialty Co., Eddington, Pa.
Fluor Products Co., Whittier, Calif.
General Ceramics Corp., Keasbey, N. J. (ceramic and plastic)
Gray Co., Inc., Minneapolis, Minn.
Harry Cooling Towers, Inc., New York, N.Y.
Link-Belt Co., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill. (air operated)
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Parks-Cramer Co., Fitchburg, Mass.

Plummer Spray Equipment Co., Napoleon, O.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Rosemead, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Burlington, Mass.
Spraying Systems Co., Bellwood, Ill.
Stearns Co., N. C., Shreveport, La.
Steinen Mfg. Co., Wm., Newark, N. J.
Supreme Electric Products Corp., Rochester, N. Y.
Thermal Agency, Houston, Tex.
TOT Towers, Inc., Houston, Tex.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Worthington Corp., East Orange, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

NUTS AND WASHERS, LOCK

Allmetal Screw Products Co., Inc., Garden City, Long Island, N. Y.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grip Nut Co., South Whitley, Ind.
Harper Co., H. M., Morton Grove, Ill.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Moore Inc., Goodloe E., Danville, Ill.
Phoell Mfg. Co., Chicago, Ill.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
SKF Industries, Inc., Philadelphia, Pa.
Shakeproof Div., Illinois Tool Wks., Elgin, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
Star Stainless Screw Co., Paterson, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Tinnerman Products, Inc., Cleveland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observations, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL, CUTTING, PIPE

Beaver Pipe Tools, Inc., Warren, O.
Blue Seal Chemical Co., Roselle Park, N. J.
Capewell Mfg. Co., Hartford, Conn.
Gulf Oil Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Ridge Tool Co., Elyria, O.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Shell Oil Co., Lubricants Dept., Flushing, N. Y.
Socony-Mobil Oil Co., Inc., New York, N. Y.
Standard Oil Co. of California, San Francisco, Calif.
Standard Oil Co. of Indiana, Chicago, Ill.
Suflo, Inc., Elizabeth, N. J.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Whitlam Mfg. Co., J. C., Wadsworth, O.
X Laboratories, Inc., New York, N. Y.

OIL, HEAT TRANSFER

Gulf Oil Corp., Pittsburgh, Pa.
Monsanto Chemical Co., St. Louis, Mo.
Shell Oil Co., Lubricants Dept., Flushing, N. Y.
Socony-Mobil Oil Co., Inc., New York, N. Y.
Standard Oil Co. of Indiana, Chicago, Ill.
Sun Oil Co., Philadelphia, Pa.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.

OIL, REFRIGERATION

Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Gulf Oil Corp., Pittsburgh, Pa.
Illinois Oil Products, Inc., Rock Island, Ill.
Sealed Units Parts Co., Inc., Bronx, N. Y.
Shell Oil Co., Lubricants Dept., Flushing, N. Y.
Socony-Mobil Oil Co., Inc., New York, N. Y.
Standard Oil Co. of California, San Francisco, Calif.
Standard Oil Co. of Indiana, Chicago, Ill.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

OIL SEPARATORS

See Separators, Oil

OILERS, FOR REFRIGERATION COMPRESSORS

Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury, Conn.
Refrigeration Devices Co., Nutley, N. J.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Trico Fuse Mfg. Co., Milwaukee, Wis.

OILS, FOR COATING VISCOUS AIR FILTERS

Continental Air Filters Inc., Louisville, Ky.
Gulf Oil Co., Pittsburgh, Pa.
Research Products Corp., Madison, Wis.
Standard Oil Co. of California, San Francisco, Calif.
Trion, Inc., McKees Rocks, Pa.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Vortox Co., Claremont, Calif.

OIL HEATERS

See Heaters, Oil Tank, Suction Bell

OIL PREHEATERS

See Heaters, Oil Tank, Suction Bell; Preheaters, Fuel Oil; Units, Fuel Oil, Heating, Pumping and Straining

OPERATORS, DAMPER, DUCT

Ace Instrument Co., Inc., Brooklyn, N. Y.
Arens Controls, Inc., Evanston, Ill.
Atmos Corp., Chicago, Ill.
Au-Temp-Co Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bressler Engineering Service, Oregon, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cleveland Controls, Inc., Cleveland, O.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Consolidated Metal Products Corp., Albany, N. Y.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Defender Instrument & Regulator Co., Boody, Ill.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hart & Cooley Mfg. Co., Holland, Mich.
Heat-Timer Corp., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Nichols Instruments Co., Baltimore, Md.
Powers Regulator Co., Skokie, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Markesan, Wis.
Taylor Instrument Companies, Rochester, N. Y.
Wa-Trol, Houston, Tex.
Young Regulator Co., Cleveland, O.

OPERATORS, VALVE, HYDRAULIC OR ELECTRIC

Ace Instrument Co., Inc., Brooklyn, N. Y.
Arens Controls, Inc., Evanston, Ill.
Au-Temp-Co Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cameron Iron Works, Inc., Houston, Tex.
Carter Controls, Inc., Lansing, Ill.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
De Zurik Corp., Sartell, Minn.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hanna Engineering Wks., Chicago, Ill.
Heat-Timer Corp., New York, N. Y.
Janette Electric Mfg. Co., Morton Grove, Ill.
Johnson Service Co., Milwaukee, Wis.
Kieley & Mueller, Inc., Middletown, N. Y.
Ledeen Mfg. Co., El Monte, Calif.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Nichols Instruments Co., Baltimore, Md.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Sparton Corp., Jackson, Mich.
Techniflex Corp., Port Jervis, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Weighing & Control Components, Inc., Hatboro, Pa.

OPERATORS, VALVE, REMOTE, HAND

Babbitt Steam Specialty Co., New Bedford, Mass.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Stow Mfg. Co., Binghamton, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, FLOW MEASURING

American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Madden Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Phoenix Products Co., Milwaukee, Wis. (spun metal)
Republic Flow Meters Co., Chicago, Ill.

Simplex Valve & Meter Co., Lancaster, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
U. S. Valve & Mfg. Co., S. San Francisco.

ORIFICES, RADIATOR

Au-Temp-Co Corp., New York, N. Y.
Barnes & Jones, Inc., Newtonville, Mass.
Cashin Co., W. D., Boston, Mass.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

OVERFIRE AIR JETS

See Jets, Overfire Air, for Smoke Abatement

OVERHEAD VALVE OPERATORS

See Operators, Valve, Remote, Hand

OVER-PRESSURE UNLOADERS, FOR REFRIGERANTS

Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Hubbell Corp., Mundelein, Ill.

OXY-ACETYLENE WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

OXYGEN PIPING AND REGULATING SYSTEMS

Burdette Oxygen Co. of Calif., Huntington Park, Calif.
Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Melchior, Armstrong, Dessau Co. of Delaware, Inc., Ridgefield, N. J.
National Cylinder Gas Co., Chicago, Ill.
Oxygen Equipment & Service Co., Chicago.
Research Vacuum Supply Co., Chicago, Ill.
Superior Valve & Fittings Co., Pittsburgh, Pa.

OZONE APPARATUS

Michael Electric Co., Inc., New Haven, Conn.
Montgomery Bros., San Francisco, Calif.
Norwood Associated Engineers Inc., Springfield, Mass.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.

PACKAGED HEAT PUMP UNITS

See Unit, Air Conditioning, Reverse Refrigeration Cycle

PACKAGED STEAM GENERATORS

See Boilers, Packaged Units, Heating and Process

PACKING, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (insulating panel for housing)
Chesterton Co., A. W., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Packing Co., Morton Grove, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gatke Corp., Chicago, Ill.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson, Inc., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
New York Belting & Packing Co., Passaic, N. J.
Nicolet Industries, Inc., Hamilton, O.
North American Asbestos Corp., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rhopac, Inc., Skokie, Ill.
Sims Pump Valve Co., Hoboken, N. J.
Superior Valve & Fittings Co., Pittsburgh, Pa.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, FIBER

Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chesterton Co., A. W., Everett, Mass.
Crane Packing Co., Morton Grove, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Goodall Rubber Co., Trenton, N. J.
Greene, Tweed & Co., North Wales, Pa.
Hinde & Dauch Paper Co., Sandusky, O.
Johns-Manville, New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
New York Belting & Packing Co., Passaic, N. J.
North American Asbestos Corp., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Sims Pump Valve Co., Hoboken, N. J.
Superior Valve & Fittings Co., Pittsburgh, Pa.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Garlock Packing Co., Palmyra, N. Y.
Graton & Knight Co., Inc., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Pacific States Felt & Mfg. Co., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Rhoads & Sons, J. E., Wilmington, Del.
Schieren Co., Chas. A., Camden, N. J.
Sims Pump Valve Co., Hoboken, N. J.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Williams & Son, I. B., Dover, N. H.
Zimmerman Packing Co., Cincinnati, O.

PACKING, METALLIC

Abbott & Biddle Co., Philadelphia, Pa.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chesterton Co., A. W., Everett, Mass.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Morton Grove, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Johnston Foil Mfg. Co., St. Louis, Mo.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Sims Pump Valve Co., Hoboken, N. J.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, RUBBER AND SYNTHETIC

Allpax Co., Inc., Mamaroneck, N. Y.
American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Baker & Co., R. H., Los Angeles, Calif.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Chesterton Co., A. W., Everett, Mass.
Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Greene, Tweed & Co., North Wales, Pa.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hewitt-Robins, Inc., Stamford, Conn.
Houghton & Co., E. F., Philadelphia, Pa.
Johns-Manville, New York, N. Y.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Linear Incorporated, Philadelphia, Pa. (semi-metallic, non-metallic)
Minnesota Rubber & Gasket Co., Minneapolis, Minn.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Div., H. K. Porter Co., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rhopac, Inc., Skokie, Ill.
Rubber Products Div., Parker-Hannifin Corp., Cleveland, O.
Saran Lined Pipe Co., Ferndale, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Thermoid Co., Trenton, N. J.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Western Felt Works, Chicago, Ill.
Xylos Rubber Co., Akron, O.
Zimmerman Packing Co., Cincinnati, O.

PAINT, HIGH TEMPERATURE, FOR HOT SURFACES

Arco Co., The, Cleveland, O.
Babbitt Chemical Co., New Bedford, Mass.
Barreled Sunlight Paint Co., Providence, R. I. (heat resistant aluminum)
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chem Industrial Co., Brooklyn, O.
Chemical Coatings & Engineering Co., Edgemont, Pa.
Chemical Solvent Co., Birmingham, Ala.
Claronex Products, Inc., Brooklyn, N. Y.
Continental Products Co., Euclid, O.
Corrosion Control Co., Inc., New York, N. Y.
Debevoise Co., The, Brooklyn, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
du Pont de Nemours & Co., E. I., Finishes Div., Wilmington, Del.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Foster Co., Benjamin, Philadelphia, Pa.
General Paint Corp., San Francisco, Calif.

Hague & Co., Inc., Alfred, Div. of Lacquer & Chemical Corp., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Illinois Bronze Powder Co., Chicago, Ill.
Koppers Company, Inc., Pittsburgh, Pa.
Markal Co., Chicago, Ill.
Master Mechanics Co., The, Cleveland, O.
Metal & Thermit Corp., Rahway, N. J.
Midland Paint & Varnish Co., Cleveland, O.
National Pipe Coatings, Inc., Huntington Park, Calif.
Nebel Mfg. Co., Cleveland, O.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Randolph-Page, Inc., New York, N. Y. (for radiators)
S.O.S. Products Co., Inc., Brooklyn, N. Y.
Sandstrom Products Co., Port Byron, Ill.
Sherwin-Williams Co., The, Cleveland, O.
Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y. (heat-resisting aluminum)
Speco, Inc., Cleveland, O.
Steelcote Mfg. Co., St. Louis, Mo.
Thompson and Co., Oakmont, Pa.
Tropical Paint Co., Cleveland, O.
Truscon Laboratories Div., Devoe & Raynolds Co., Inc., Detroit, Mich.
Valdura Div., American-Marietta Co., Chicago, Ill.
Warren Refining & Chemical Co., The, Cleveland, O.
Whitlam Mfg. Co., J. C., Wadsworth, O.
Wilbur & Williams Co., Brighton, Mass.

PANEL BOARDS

See Boards, Panel and Control

PANEL HEATING AND COOLING

See Coils and Panels, Radiant Heating and Cooling; Conductors and Panels, Electrical, for Radiant Heating

PANELS, WINDOW, FOR AIR DIFFUSION

Diamond Mfg. Co., Wyoming, Pa.
Harrington & King Perforating Co., Inc., Chicago.
Mahon Co., R. C., The, Detroit, Mich.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Simplex Ceiling Corp., New York, N. Y.
Wakefield Co., The, Vermilion, O.

PANELS, WINDOW, FOR AIR CONDITIONERS

Russell Co., F. C., The, Cleveland, Ohio
Southern Plastics Co., Columbia, S. C.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
Adams Co., The, Dubuque, Iowa
Air & Refrigeration Corp., New York, N. Y. (factory insulated panels)
Alter Co., Harry, Chicago, Ill.
Atlas Mfg. Co., St. Paul, Minn. (boiler jackets, furnace cabinets, air conditioning cabinets)
Berger Div., Republic Steel Corp., Canton, O. (cabinets, housings, canopies)
By-Buk Co., Los Angeles, Calif. (pressure sensitive corner pads for preventing surface scratches)
Campco Div., Chicago Molded Products Corp., Chicago, Ill. (Knobs and handles)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Cincinnati Metalcrafts Inc., Cincinnati, O. (sheet metal fabricating)
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
Duro-Dyne Corp., New Hyde Park, L. I., N. Y. (hardware and parts used in fabricating dampers and turning vanes)
Eaton Mfg. Co., Foundry Div., Vassar, Mich. (gray iron castings for air conditioning equipment)
Falstrom Co., Passaic, N. J. (Air conditioning cabinets, steel control panels)
Federal-Mogul Div., Federal-Mogul-Bower Bearings, Inc., Detroit, Mich. (bushings, sleeves, ferrules)
General Tire & Rubber Co., Logansport, Ind. (Blower mounting)
Harrison Sheet Steel Co., Chicago, Ill. (covers for radiators)
Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
National Lock Co., Inc., Rockford, Ill. (hinges, handles, latches, catches, supports, etc.)
Nylok Corp., The, Paramus, N. J. (self-locking fasteners)
Phoenix Products Co., Milwaukee, Wis. (metal spinnings for fan housings, diffusers, etc.)
Pittsfield Products, Inc., Ann Arbor, Mich. (perforated wire cloth parts)
Reco Products Div., Recony Corp., New York, N. Y.
South Chester Corp., Southco Div., Lester, Pa. (blind rivets, panel fasteners, door retaining springs)
Standard Pressed Steel Co., Jenkintown, Pa. (socket screws, spring pins)
Utica Products, Inc., Utica, N. Y.
Ventfabrics, Inc., Chicago, Ill. (damper hardware for making dampers) (latches and hardware fan access doors)

PARTS, REFRIGERATING COMPRESSORS

(Manufacturers of parts only for repairing compressors. For manufacturers of compressors — See Compressors, Refrigerating)

Hunt Spiller Mfg. Corp., Boston, Mass.
Production Stamping Co., Omaha, Nebr.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Shank Co., Cyrus, Chicago, Ill.

PENETRANT, DYE, FOR NON-DESTRUCTIVE TESTING OF METAL

Met-L-Chek Co., Los Angeles, Calif.
Turco Products, Inc., Los Angeles, Calif.

PENETRANT SOLVENT FOR LOOSENING THREADED JOINTS

See Solvent, Penetrant

pH INDICATORS

See Indicators, pH

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PILOTS, GAS, FOR OIL BURNERS

Eclipse Fuel Engineering Co., Rockford, Ill.
Ransome Co., Emeryville, Calif.
Schurs Oil Burner Co., Los Angeles, Calif.
Scully Signal Co., Melrose, Mass.
White-Rodgers Co., St. Louis, Mo.

PIPE, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
Aluminum Tubing Co., Jacksonville, Fla.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Fluor Products Co., Whittier, Calif.
Harvey Aluminum, Torrance, Calif.
Kaiser Aluminum & Chemical Sales, Inc., Chicago, Ill.
Revere Copper & Brass, Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Wolverine Tube, Div. of Calumet and Hecla, Inc., Allen Park, Mich.
Youngstown Welding & Engineering Co., Youngstown, O.

PIPE, ASBESTOS FIBER AND CEMENT

Enderle, Inc., Ltd., Frank X., Los Angeles, Calif.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.

PIPE BENDERS

See Benders, Pipe

PIPE BIT SETS

See sets, Pipe Bit

PIPE, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
American Sanitary Mfg. Co., Abingdon, Ill.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Gardiner Metal Co., Chicago, Ill.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Lewin-Mathes Co., Div. of Cerro de Pasco Corp., St. Louis, Mo.
Mueller Co., Decatur, Ill.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., New York, N. Y.
Reading Tube Corp., New York, N. Y.
Revere Copper and Brass, Inc., New York, N. Y.
Roberts Tube Div., Prestyle Mfg. Co., Detroit, Mich.
Wolverine Tube, Div. of Calumet and Hecla, Inc., Allen Park, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., Newark, N. J.
Clow & Sons, Inc., James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., New York, N. Y.
United States Pipe & Foundry Co., Birmingham, Ala.

PIPE, CAST IRON, PRESSURE FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, Inc., James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., New York, N. Y.
United States Pipe & Foundry Co., Birmingham, Ala.

PIPE, CAST IRON, THREADED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, Inc., James B., Chicago, Ill.
United States Pipe & Foundry Co., Birmingham, Ala.

PIPE CLEANING COMPOUNDS

See Compounds, Cleaning Pipe Coil and Condenser

PIPE CLEANING MACHINES

See Machines, Pipe Cleaning; Cleaners, Pipe Line, Electrically Driven; Rams, Water, for Cleaning Out Pipe Lines

PIPE COILS

See Coils, Pipe

PIPE COUPLINGS

See Couplings, Pipe

PIPE COVERING, ADHESIVES

See Adhesives, for Pipe Covering

PIPE CUTTERS

See Cutters, Pipe

PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading; Cleaners, Pipe Line, Electrically Driven; Rams, Water, for Cleaning Out Pipe Lines

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Brown Co., Boston, Mass.
Central Foundry Co., Newark, N. J.
Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Orangeburg Mfg. Co., Orangeburg, N. Y.

PIPE, FINNED

California Steel Products, Div. of Yuba Consolidated Industries, Inc., Richmond, Calif.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Edwards Engineering Corp., Pompton Plains, N. J.
Frick Co., Waynesboro, Pa. (square and spiral)
Imeco, Inc., Chicago, Ill.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
Rome-Turney Radiator Co., Rome, N. Y.
Sterling Radiator Co., Inc., Westfield, Mass.
Tenney Engineering, Inc., Union, N. J.
Vulcan Radiator Co., Hartford, Conn.

PIPE AND FITTINGS, GAS VENT AND FLUE

Condensation Engineering Corp., Chicago, Ill.
Dura-Vent Corp., Redwood City, Calif.
Enderle, Inc., Ltd., Frank X., Los Angeles, Calif.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Harvey Aluminum, Torrance, Calif.
Johns-Manville, New York, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Metal Fabricators, Inc., Charlotte, N. C.
Meyer & Bro. Co., F., Peoria, Ill.
Mirror Patented Stove Pipe Co., Hartford, Conn.
Robinson Clay Product Co., The, Akron, O.
Van-Packer Co., Div. of the Flintkote Co., Bettendorf, Ia.
Wallace Co., William, Metalbestos Div., Belmont, Calif.
Waverly Heating Supply Co., Beverly, Mass.
Williamson Co., The, Cincinnati, O.

PIPE FITTINGS

See Fittings, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Gates Engineering Co., Wilmington, Del.
General Tire & Rubber Co., Akron, O.
Goodrich Industrial Products Co., B. F., Akron, O.
Hewitt-Robins, Inc., Stamford, Conn.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Raybestos-Manhattan, Inc., Passaic, N. J. (Flexible)
United States Rubber Co., New York, N. Y.
Vanton Pump & Equipment Corp., Hillside, N. J.

PIPE INSULATION ADHESIVES

See Adhesives, for Pipe Covering

PIPE, JACKETED

Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Durant Insulated Pipe Co., E. Palo Alto, Calif.
Flori Pipe Co., The, St. Louis, Mo.
Heat & Power Corp., Baltimore, Md.
Hetherington & Berner, Inc., Indianapolis, Ind.
Kaiser Co., E. B., Glenview, Ill.
Midwest Piping Co., Inc., St. Louis, Mo.
Nooter Corp., St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pittsburgh, Pa.
Red Jacket, Inc., Carnegie, Pa.
Ric-wiL, Inc., Barberton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., Toledo, O.
Taylor Engineering Corp., Detroit, Mich.
Youngstown Welding & Engineering Co., Youngstown, O.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE LOCATORS

See Locators, Pipe, Underground

PIPE, LINED

American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Rubber)
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Barrows Porcelain Enamel Corp., Cincinnati, O. (glass, ceramic-coated)
Bart Mfg. Corp., Belleville, N. J.
Cement Lined Pipe Co., Lynn, Mass. (Cement)
Division Lead Co., Summit, Ill.
Gates Engineering Co., Wilmington, Del.
Goodrich Industrial Products Co., B. F., Akron, O.
Heil Process Equipment Corp., Cleveland, O.
Heresite & Chemical Co., Manitowoc, Wis. (Phenolic baking type; synthetic rubber coating)
Hill, Hubbell & Co., Cleveland, O.
Kaiser Co., E. B., Glenview, Ill.
Knapp Mills, Inc., Long Island City, N. Y.
Knight, Maurice A., Akron, O.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Gagetown, Mich. (Wood, saran rubber)
National Lead Co., New York, N. Y. (Lead)
Nooter Corp., St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Saran Lined Pipe Co., Ferndale, Mich. (saran lined)
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., New York, N. Y. (cement)
United States Rubber Co., New York, N. Y. (Rubber)
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Biggs Boiler Works Co., The, E. Akron, O.
Chase Brass & Copper Co., Waterbury, Conn.
Crucible Steel Co. of America, Pittsburgh, Pa.
Electric Steel Foundry Co., Portland, Ore.
Fluor Products Co., Whittier, Calif.
International Nickel Co., Inc., The, New York, N. Y.
Revere Copper and Brass, Inc., New York, N. Y.
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Youngstown Welding & Engineering Co., **Youngstown, O.**

PIPE, NICKEL PLATED

Alco Products, Inc., Schenectady, N. Y.
Bart Mfg. Corp., Belleville, N. J.
Saran Lined Pipe Co., Ferndale, Mich. (lectro-clad)

PIPE, PLASTIC

Alpha Plastics, Inc., Livingston, N. J. (PVC, rigid)
Amco Plastic Pipe Co., San Leandro, Calif. (rigid & semi-flexible)
American Agile Corp., Bedford, O.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (rigid, flexible)
American Molding Co., San Francisco, Calif.
Anesite Co., Chicago, Ill. (polyethylene, butyrate)
Argo Plastic Products, Cleveland, O.
Associated Plastic Co's., Inc., Midland, Mich. (rigid polyvinyl)
Atlas Mineral Products Co., Mertztown, Pa. (rigid polyvinyl chloride for service up to 150 F)
Byers Co., A. M., Pittsburgh, Pa. (PVC)
Carlon Products Corp., Cleveland, O.
Chesflex Corp., Yonkers, N. Y. (polyethylene, flexible)
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (Rigid PVC 40 - 160 F pressures function of size, wall thickness and Temp.)
Commercial Plastics Co., Chicago, Ill.
Consolidated Pipe Co. of America, Akron, O.
Continental-Diamond Fibre Corp., Newark, Del.
Corite Products, Inc., Chicago, Ill. (rigid fiberglas, reinforced polyester)
Corning Glass Works, Corning, N. Y. (PVC)
Crane Co., Chicago, Ill.
Crane & Associates, Robert S., Columbus, O.
Crescent Plastics, Inc., Evansville, Ind. (flexible, semi-rigid and rigid)
Danielson Mfg. Co., Danielson, Conn.
Dow Chemical Co., Midland, Mich. (saran-lined pipe, iron or steel and saran pipe)
DuVerre, Inc., Buffalo, N. Y. (polyester bonded fiber glass)
Easton Plastic Products Co., Easton, Pa. (rigid-unplasticized polyvinyl chloride)
Evanite Plastic Co., Div. of Evans Pipe Co., Uhrichsville, O.
Fibercast Corp., Sand Spring, Okla. (rigid; 0-1000 psi; −60F to 300F)
Franklin Plastics, Inc., Franklin, Pa. (polyethylene non-rigid. Temp. not to exceed 140 F. Pressures from 40 to 104 lbs.)
General Tire & Rubber Co., Akron, O.
Goodall Rubber Co., Trenton, N. J.
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O. (polyvinyl chloride rigid)
Goodrich Industrial Products Co., B. F., Akron, O. (Max. 150 F pressures to 400 psi; rigid)
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hartwell & Son, Inc., H. N., Boston, Mass. (rigid PVC)
Haveg Industries, Inc., Newark, Del. (Resin-asbestos, polyester glass & polyvinyl chloride)
Heil Process Equipment Corp., Cleveland, O. (rigid)
Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J. (flexible)
Johnson Plastic Corp., Chagrin Falls, O. (polyethylene, tenite & kralastic)
Knight, Maurice A., Akron, O. (rigid, glass cloth reinforced resin 280 F)
Kraloy Plastic Pipe Co., Inc., Los Angeles.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Luzerne Rubber Co., Trenton, N. J. (rigid-PVC)
Lynch Asbestos Co., Los Angeles, Calif. (rigid & non-rigid; polyethylene; kralastic; PVC)
Manufacturers Corp., Mansfield, O.
Marken Plastics Corp., Los Angeles, Calif. PVC and polyethylene)
Minnesota Mining & Mfg. Co., St. Paul, Minn. (2" to 3" 150 F Max. 1200 psi) (reinforced plastic; rigid)
Mueller Brass Co., Port Huron, Mich. (Rigid temp. range up to 175 F; non-rigid temp. range up to 140 F)
Munray Products, Inc., Cleveland, O. (polyethylene, flexible)
National Tube Div., United States Steel Corp., Pittsburgh, Pa. (flexible polyethylene) (rigid polyvinyl chloride)
Orangeburg Mfg. Co., Orangeburg, N. Y. (polyethylene, flexible, to 150 psi)
Perfex Plastics, Inc., Chicago, Ill.
Plastex Corp., Columbus, O. (non-rigid)
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif. (flexible polyethylene; semi-rigid butyrate)
Polymer Corp. of Pa., The, Reading, Pa. (rigid, nylon)
Pyramid Plastics, Inc., Chicago, Ill. (saran; rigid)
Reflin Co., San Diego, Calif. (rigid, reinforced with glass fibers 200 psi; 170F)
Republic Steel Corp., Cleveland, O. (polyethylene, kralastic, and butyrate; flexible & semi rigid)

Ryerson & Son, Inc., Joseph T., Chicago, Ill. (PVC rigid & non-rigid)
Saran Lined Pipe Co., Ferndale, Mich. (saran)
Seelye Craftsmen, The, Minneapolis, Minn. (rigid)
Skyline Industries Sales, Inc., Titusville, Pa. (rigid and flexible)
Southern Plastics Co., Columbia, S. C. (rigid, non-rigid)
Southwestern Plastic Pipe Co., Mineral Wells, Tex.
Texas Vitrified Pipe Co., Mineral Wells, Tex. (Polyethylene-Rigid PVC)
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J. (flexible, semi-rigid high impact & rigid PVC)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O.
Vanton Pump & Equipment Corp., Hillside, N. J. (rigid up to 225F; PVS)
Walworth Co., New York, N. Y.
Western Plastics Corp., Tacoma, Wash. polyethylene & kralastic)
Yardley Plastics Co., Columbus, O. (rigid and non-rigid O F - 125 F)
Youngstown Sheet & Tube Co., Youngstown, O. (rigid)

PIPE PLUGS
See Plugs, Pipe

PIPE, PRE-INSULATED
Beltran Associates, Inc., Brooklyn, N. Y.
Durant Insulated Pipe Co., E. Palo Alto, Calif.
Durant Insulated Pipe Co., Inc., Williamstown, N. J.
Kaiser Co., E. B., Glenview, Ill.
Ric-wiL, Inc., Barberton, O.

PIPE REAMERS
See Reamers, Pipe

PIPE REPAIR CLAMPS
See Clamps, Pipe Repair

PIPE, SPIRAL, FOR HIGH VELOCITY AIR SYSTEMS
See Ducts, Spiral Welded

PIPE, SPIRAL, WELDED
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Naylor Pipe Co., Chicago, Ill.
Nikoh Tube Co., Chicago, Ill.
Taylor Forge & Pipe Wks., Chicago, Ill.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

PIPE, STEAM TRACED
Aluminum Co. of America, Pittsburgh, Pa.

PIPE, STEEL, BUTT AND LAP WELDED
Bethlehem Steel Co., Bethlehem, Pa.
Biggs Boiler Works Co., The, E. Akron, O. (large diameter)
Central Steel & Wire Co., Chicago, Ill.
Chicago Metal Mfg. Co., Chicago, Ill.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh. Pa.
Kellogg Co., M.W., The, New York, N. Y.
Laclede Steel Co., St. Louis, Mo.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O. (electric-weld)
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y. (Specially fabricated)
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Wheatland Tube Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS
Alco Products, Inc., Schenectady, N. Y.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Electric Steel Foundry Co., Portland, Ore.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Phoenix Iron & Steel Co., Phoenixville, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS
Alco Products, Inc., Schenectady, N. Y.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Tubing Co., Jacksonville, Fla.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
Electric Steel Foundry Co., Portland, Ore.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Fluor Products Co., Whittier, Calif.
Greenville Tubes, Inc., Greenville, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Standard Tube Co., Detroit, Mich.
Swepco Tube Corp., Clifton, N. J.
Trent Tube Co., East Troy, Wis.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STONEWARE
General Ceramics Corp., Keasbey, N. J.
Knight, Maurice A., Akron, O. (acid-proof)
United States Stoneware Co., New York, N. Y.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O. (also porcelain)

PIPE SUPPORTS
See Hangers and Supports, Pipe

PIPE SURFACE, THERMOMETERS
See Thermometers, Indicating, Pipe Surface

PIPE, TIN
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Bunker Hill Co., The, Sales & Fabrication Div., Seattle, Wash.
Division Lead Co., Summit, Ill.
Enderle, Inc., Ltd., Frank X., Los Angeles, Calif.
National Lead Co., New York, N. Y.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y.

PIPE TONGS
See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE
General Ceramics Corp., Keasbey, N. J.
National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Bunker Hill Co., The, Sales & Fabrication Div., Seattle, Wash.
Division Lead Co., Summit, Ill.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Knapp Mills, Inc., Long Island City, N. Y.
National Lead Co., New York, N. Y.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y.
Rochester Lead Works, Inc., Rochester, N. Y.

PIPE, VITRIFIED CLAY
Bowerston Shale Co., The, Bowerston, O.
General Ceramics Corp., Keasbey, N. J.
Heat Transmission Conduit Co., Cleveland, O.
Logan Clay Products, Logan, O.
National Clay Pipe Mfg. Inc., Washington, D. C.
Robinson Clay Product Co., The, Akron, O.
Stillwater Clay Products Co., The, Cleveland, O.
Straitsville Brick Co., New Straitsville, O.
Superior Clay Corp., The, Uhrichsville, O.
Texas Vitrified Pipe Co., Mineral Wells, Tex.

PIPE, WOOD
Fluor Products Co., Whittier, Calif.

PIPE WRENCHES
See Wrenches, Pipe

PIPE, WROUGHT IRON
Byers Co., A. M., Pittsburgh, Pa.

PIPING, FABRICATED
See Bends, Expansion, Steam Pipe; Headers, Pipe, Welded; Coils, Pipe

PIPING IDENTIFICATON MARKERS
See Identification Markers for Piping Services

PISTON RINGS
See Rings, Piston

PITOT TUBES
See Tubes, Pitot

PITTSBURGH LOCK FORMING MACHINES
See Machines, Pittsburgh Lock Forming

PLASTIC PIPE METAL INSERTS
See Inserts, Metals, for Plastic Pipe

PLASTIC PIPE AND PIPE FITTINGS
See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC PIPE AND SHEET WELDERS
See Welders, for Plastic Pipe or Plastic Sheet

PLASTIC SHEETS FOR DUCTS AND HOODS
See Sheets, Plastic for Ducts and Hoods

PLASTIC TUBING
See Tubing, Plastic

PLASTICS, POWDERS AND RESINS (BASIC MATERIALS)
Bakelite Co., Div. of Union Carbide & Carbon Chemical Corp., New York, N. Y.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Chemical Sales Div., Firestone Plastics Co., Pottstown, Pa.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Co., Midland, Mich.
du Pont de Nemours & Co., E. I. Polychemicals Dept., Wilmington, Del. (nylon, polyethylene, tetrafluoroethylene & acrylic resins)
Durez Plastics Div., Hooker Electrochemical Co., North Tonawanda, N. Y.

Eastman Chemical Products, Inc., Subsidiary, Eastman Kodak Co., New York, N. Y.
General Electric Co., Chemical & Materials Dept., Pittsfield, Mass. (phenolic)
General Tire & Rubber Co., Akron, O.
Goodrich Chemical Co., B. F., Cleveland, O.
Interchemical Corp., Finishes Div., Newark, N. J. (polyester resins)
Koppers Co., Inc., Pittsburgh, Pa.
Metal & Thermit Corp., Rahway, N. J.
Naugatuck Chemical Div., U. S. Rubber Co., Naugatuck, Conn.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastics Div., Eastman Chemical Products, Inc., Kingsport, Tenn. (acetate, butyrate, polyethylene)
Polymer Corp. of Pa., The, Reading, Pa.

PLATES, FLOOR AND CEILING

Ackermann Mfg. Co., Wheeling, W. Va.
American Sanitary Mfg. Co., Abingdon, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Eastern Stainless Steel Corp., Baltimore, Md.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
G & H Mfg. Co., Philadelphia, Pa.
Globe Products, Huppower Div., Hupp Corp., Detroit, Mich.
Grinnell Co., Providence, R. I.
Inland Steel Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Little Brass Goods Co., M. S., Hartford, Conn.
Modern Hanger Corp., The, Cleveland, O.
New York Air Valve Corp., Brooklyn, N. Y.
Pipe Plugs, Inc., Wellington, O.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
U. S. Expansion Bolt Co., York, Pa.
U. S. Plug & Fitting Co., Wellington, O.
Walworth Co., New York, N. Y.
Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

PLUGS, CAPS AND CLOSURES FOR PROTECTING PIPE AND TUBE FITTINGS

Clover Industries, Inc., Tonawanda, N. Y.
Protective Closures Co., Inc., CaPlugs Div., Buffalo, N. Y.

PLUG COCKS

See Valves, Plug

PLUG VALVES

See Valves, Plug

PLUGS, FUSIBLE, BOILER

Allen Mfg. Co., W. D., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Chiksan Co., Brea, Calif.
Division Lead Co., Summit, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lamson & Sessions Co., The, Cleveland, O.
Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Powell Co., Wm., The, Cincinnati, O.
Swift Lubricator Co., Inc., Elmira, N. Y.

PLUGS, PIPE, MAGNETIC, FOR REMOVING FERROUS PARTICLES

Pipe Plugs, Inc., Wellington, O.
U. S. Plug & Fitting Co., Wellington, O.

PLUGS, REPAIR, FOR PIPE

Adams Pipe Repair Products, El Monte, Calif.
Allen Mfg. Co., W. D., Chicago, Ill.
Baker & Co., R. H., Los Angeles, Calif.
Kuhns Bros. Co., Dayton, O.
Parker-Kalon Div., Gen. Am. Trans. Corp., Clifton, N. J.
Pipe Plugs, Inc., Wellington, O.
Scharer & Co., Ray A., Detroit, Mich.

PLUGS, REPAIR, FOR TANKS

Adams Pipe Repair Products, El Monte, Calif.
Baker & Co., R. H., Los Angeles, Calif.
Chicago Specialty Mfg. Co., Chicago, Ill.
Kenney Co., L. C., Chicago, Ill.
Parker-Kalon Div., Gen. Am. Trans. Corp., Clifton, N. J.
Pipe Plugs, Inc., Wellington, O.
Standard Pressed Steel Co., Jenkintown, Pa.
U. S. Plug & Fitting Co., Wellington, O.

PLUGS, TUBING TEST

Chicago Specialty Mfg. Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Mechanical Products Corp., Chicago, Ill.

PORTS, OBSERVATION, BOILER

Bigelow Liptak Corp., Detroit, Mich.
Detroit Stoker Co., Monroe, Mich.
Ess Instrument Co., Bergenfield, N. J.
Green Fire Brick Co., Mexico, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Plibrico Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reintjes Co., Geo. P., Kansas City, Mo.
Springfield Boiler Co., Springfield, Ill.

POSITIONERS, WELDING

Johnson Machine Works, Eau Claire, Wis.
Sight Feed Generator Co., West Alexandria, O. (automatic; submerged arc)
Webb Corp., The, Webb City, Mo.
Weldit, Inc., Detroit, Mich.
Worthington Corp., East Orange, N. J.

POWER FACTOR CORRECTION

See Capacitors

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alco Products, Inc., Schenectady, N. Y.
Alstrom Corp., New York, N. Y.
Andale Co., Philadelphia, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Buxton Mfg. Co., Dover, N. J.
California Steel Products, Div. of Yuba Consolidated Industries Inc., Richmond, Calif.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drying Systems Co., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Electro-Therm, Inc., Silver Spring, Md.
Engineer Co., New York, N. Y.
Falcon Equipment Co., New Brighton, Pa.
General Fittings Co., East Greenwich, R. I.
Griscom-Russell Co., Massillon, O.
Hauck Mfg. Co., Brooklyn, N. Y.
Heatron, Inc., York, Pa.
Heatube Corp., Allegan, Mich.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo. (Electric)
Johnson Corp., The, Three Rivers, Mich.
Kaiser Co., E. B., Glenview, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Leahy Mfg. Co., Los Angeles, Calif.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Lientz Co., B. P., Kansas City, Mo.
Manning & Lewis Engineering Co., Newark, N. J.
Mar-Coil Heater Co., Union City, N. J.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Richmond, Va.
Ross Heat Exchanger Div., American Radiator & Standard Sanitary Corp., Buffalo, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Sims Co., Erie, Pa.
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., New York, N. Y.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Todd Shipyards Corp., Products Div., Brooklyn, N. Y.
Tranter Mfg., Inc., Lansing, Mich.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Whitlock Mfg. Co., W. Hartford, Conn.
Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)
Yula Water Heaters, Inc., Bronx, N. Y.

PREHEATERS AND STRESS RELIEVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Fluor Products Co., Whittier, Calif.
Heatube Corp., Allegan, Mich.
Trent Inc., Philadelphia, Pa.
Universal Welder Corp., Cleveland, O.
Vulcan Electric Co., Danvers, Mass.
Wiegand Co., Edwin L., Pittsburgh, Pa.

PRE-INSULATED PIPE

See Pipe, Pre-Insulated

PRESSURE BLOWERS

See Blowers, High Pressure

PRESSURE CONTROLLERS

See Regulators, Pressure

PRESSURE GAGES

See Gages, Indicating, Pressure

PRESSURE INDICATOR-CONTROLLERS

See Indicator-Controllers, Pressure

PRESSURE RECORDER-CONTROLLERS

See Recorder-Controllers, Pressure

PRESSURE RECORDERS

See Recorders, Pressure and Vacuum

PRESSURE REDUCING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATORS

See Regulators, Pressure

PRESSURE SWITCHES

See Switches, Pressure and Vacuum

PROCESS HEATING SYSTEMS

See Systems, Process Heating, High Temperature

PROCESS STEAM SUPERHEATERS

See Superheaters, Process Steam

PROCESS AND STORAGE TANKS

See Tanks, Process and Storage

PROPANE VAPORIZERS

See Vaporizers

PROPELLER FANS

See Fans, Propeller

PROPELLER PUMPS

See Pumps, Propeller

PROPORTIONING PUMPS

See Pumps, Proportioning

PROTECTIVE COATINGS
See Coatings, Protective, for Metals

PROTECTORS, GAGE GLASS
Ernst Water Column & Gauge Co., Livingston, N. J.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.

PROTECTORS, PIPE COVERING
Aljon Mfg. Co., Inc., Maspeth, N. Y.
Baldwin-Hill Co., Trenton, N. J.
Bigelow Liptak Corp., Detroit, Mich.
Blaw Knox Co., Power Piping & Sprinkler Div., Pittsburgh, Pa.
Carpenter & Paterson, Inc., Cambridge, Mass.
Childers Mfg. Co., Houston, Tex.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Grant Wilson, Inc., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Modern Hanger Corp., The, Cleveland, O.
Poe Co., C. W., The, Cleveland, O. (Alum. jacketing)
Rector Mineral Trading Corp., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Smith Products Co., Northville, Mich.

PSYCHROMETERS, MOTOR ASPIRATED
Bahnson Co., Winston-Salem, N. C.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N.Y.
Scientific Instrument Co., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

PSYCHROMETERS, SLING AND HAND ASPIRATED
Abbeon Supply Co., Jamaica, N. Y.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Moistening Co., Providence, R. I.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Scientific Equipment Co., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
H-B Instrument Co., Philadelphia, Pa.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Johnson Service Co., Milwaukee, Wis.
Kent-Moore Organization, Inc., Warren, Mich.
Moeller Instrument Co., Richmond Hill, N.Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.

PSYCHROSTATS
See Humidistats

PULLEYS AND SHEAVES, FOR BELT DRIVES
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa. (adjustable diameter)
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass. (taper bushing type)
Browning Mfg. Co., Maysville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill. (V belt)
Chicago Die Casting Mfg. Co., Chicago, Ill. (V-type and flat type)
Climax Metal Products Co., Cleveland, O. (V-belt and variable pitch)
Congress Drives Div., Tann Corp., Detroit, Mich. (V belt—fractional and multiple horsepower, and variable pitch)
Dayton Rubber Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn. (V-Belt)
Duro Metal Products Co., Chicago, Ill. (steel & diecast)
Equipment Engineering Co., Minneapolis, Minn. (variable pitch)
Ft. Worth Steel & Machinery Co., Ft. Worth, Texas
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
Hewitt-Robins, Inc., Stamford, Conn. (Tapered cone, conveyor, flanged, grooved for round or V-Belt, iron, loose, motor, power transmission)
Jones Machinery Div., Hewitt-Robins, Inc., Chicago, Ill. (flat)
Lau Blower Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind. (variable speed pulleys)
Lovejoy Flexible Coupling Co., Chicago, Ill. (variable speed pulleys, v-belt sheaves)
Maurey Mfg. Corp., Chicago, Ill. (v-belt steel and cast iron)
Mercury Clutch Div., Automatic Steel Products, Inc., Canton, O.
Pyott Foundry & Machine Co., Chicago, Ill.
Reeves Pulley Co., Div. of Reliance Electric & Engineering Co., Columbus, Ind. (variable speed)
Speed Selector Inc., Chagrin Falls, O. (variable pitch)
Sprout-Waldron & Co., Inc., Muncy, Pa. (cast iron standard pulleys)
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., East Orange, N. J. (v-type)
Zatko Metal Products Co., Euclid, O. (stamped-one piece)

PULVERIZED COAL BURNERS
See Burners, Pulverized Coal

PUMP BASES
See Bases and Pads, Vibration Isolating

PUMP-MOTOR UNITS, CLOSE-COUPLED
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Becher Pump Co., Chicago, Ill.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Canton Stoker Corp., Canton, O.
Carver Pump Co., Muscatine, Ia.
Chempump Corp., Philadelphia, Pa. (canned motor)
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Haskel Engineering & Supply Co., Glendale, Calif.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
LaBour Co., Inc., The, Elkhart, Ind.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lecourtenay Co., Newark, N. J.
Myers & Bro. Co., F. E., The, Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Ruthman Machinery Co., Cincinnati, O.
Sta-Rite Products, Inc., Delavan, Wis.
Sundstrand Hydraulic Div., Rockford, Ill.
Swaby Mfg. Co., Chicago, Ill.
Taco Heaters, Inc., Cranston, R. I.
Tuthill Pump Co., Chicago, Ill.
Uniflow Mfg. Co., Erie, Pa.
Vanton Pump & Equipment Corp., Hillside, N. J.
Warren Pumps, Inc., Warren, Mass.
Webster Electric Co., Racine, Wis.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Corp., East Orange, N. J.

PUMP UNITS, FUEL OIL
See Units, Fuel Oil, Heating, Pumping and Straining

PUMP VALVES
See Valves, Pump

PUMPS, BOILER FEED
Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
C C Pump Mfg. Div., Palmyra, N. J.
Canton Stoker Corp., Canton, O.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Clayton Mfg. Co., El Monte, Calif.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Cyclotherm Div., National-U. S. Radiator Corp., Oswego, N. Y.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Dearborn Chemical Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham-Bush, Inc., West Harford, Conn.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eclipse Fuel Enginering Co., Rockford, Ill.
Everite Pump & Mfg. Corp., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Johnston Pump Co., A Div. of Youngstown Sheet & Tube Co., Pasadena, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Fred H., Chicago, Ill.
Skidmore Corp., St. Joseph, Mich.
Sta-Rite Products, Inc., Delavan, Wis.
Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.

Swaby Mfg. Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
United Centrifugal Pumps, Oakland, Calif.
Universal Mfg. Co., Berkeley, Calif.
Warren Pumps, Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CENTRIFUGAL

Advance Pump Co., Berkeley, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Wks., Aurora, Ill.
Ampco Metal, Inc., Milwaukee, Wis.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Barrett Haentjens & Co., Hazleton, Pa.
Bart Mfg. Corp., Belleville, N. J.
Bell & Gossett Co., Morton Grove, Ill.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Carver Pump Co., Muscatine, Ia.
Chain Belt Co., Milwaukee, Wis.
Chempump Corp., Philadelphia, Pa. (magnetically driven, canned motor)
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks. Co., Columbus.
Corley Co., Inc., The, New York, N. Y.
Davidson Co., M. T., New York, N. Y.
Dayton Electric Mfg. Co., Chicago, Ill.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Dearborn Chemical Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
DeLaval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Duro Co., The, Dayton, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eco Engineering Co., Newark, N. J.
Essick Mfg. Co., Los Angeles, Calif.
Everite Pump & Mfg. Corp., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Frederick Iron & Steel Inc., Frederick, Md.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Gardner-Denver Co., Quincy, Ill.
Gen-A-Matic Corp., Van Nuys, Calif.
General Ceramics Corp., Keasby, N. J. (chemical plastic and alumina, porcelain and graphite)
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Goodfellow Co., Inc., F. D., Memphis, Tenn.
Gorman-Rupp Industries, Inc., Belleville, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Granberg Corp., Oakland, Calif.
Hoffman Specialty Mfg. Corp., Indianapolis.
Holden Co., A. F., Detroit, Mich.
Industrial Filter & Pump Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Kenco Pump Div., American Crucible Products Co., Lorain, O.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lawrence Pump Inc., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead lined and all lead)
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. **Div., Cincinnati, O.**
Little Giant Pump Co., Div. of Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marlow Pumps, Division of Bell & Gossett Co., Midland Park, N. J.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Memphis Pump & Mfg. Co., Memphis, Tenn.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
National Lead Co., New York, N. Y.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Price Pump Co., E. L., Sonoma, Calif.
Radiant Utilities Corp., Brooklyn, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Ruthman Machinery Co., Cincinnati, O.
Saran Lined Pipe Co., Ferndale, Mich. (Saran Lined)
Skidmore Corp., St. Joseph, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.
Sterling, Inc., Milwaukee, Wis.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Taco Heaters, Inc., Cranston, R. I.
Tech-Tron Corp., Lawrence, Kans.
Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
United Centrifugal Pumps, Oakland, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanton Pump & Equipment Corp., Hillside, N. J.
Warren Pumps, Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whitewater Pump Co., Inc., Whitewater, Wis.
Wilson-Snyder Wks., Oil Well Supply Div., U. S. Steel Corp., Braddock, Pa.
Wintroath Pumps, Div. of Worthington Corp., Alhambra, Calif.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CONDENSATE, FOR REMOVING CONDENSATION FROM AIR CONDITIONING UNITS

For removal of water condensed from air on cooling and dehumidifying coils. For Condensate Return Pumps, see Pumps, Condensate Return. For Air Conditioning Pumps, see Pumps of various types, such as pumps, Centrifugal and others

Ashcraft Co., J. P., Dallas, Tex.
Beach-Russ Co., New York, N. Y.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Davidson Co., M. T., New York, N. Y.
Deming Co., Salem, O.
Eastern Industries, Inc., Hamden, Conn.
Eddington Metal Specialty Co., Eddington, Pa.
Gelber & Sons, Inc., S., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Kenco Pump Div., American Crucible Products Co., Lorain, O.
Little Giant Pump Co., Div. of Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
March Mfg. Co., Inc., Skokie, Ill.
Myers & Bro. Co., F. E., The, Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Sterling, Inc., Milwaukee, Wis.
Warren Pumps, Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.

PUMPS, CONDENSATE RETURN

Advance Pump Co., Berkeley, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Barnes & Jones, Inc., Newtonville, Mass.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Canton Stoker Corp., Canton, O.
Chempump Corp., Philadelphia, Pa. (canned motors)
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Dutton Boiler Div., Hapman-Dutton, Co. Kalamazoo, Mich.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., Hamden, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Wheeler Corp., New York, N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Heating Assurance, Inc., Spokane, Wash.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Kisco Boiler & Engineering Co., St. Louis.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. **Div., Cincinnati, O.**
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roth Co., Roy E., Rock Island, Ill.
Sarco Co., Inc., New York, N. Y.
Schaub Engineering Co., Fred H., Chicago.
Sellers Engineering Co., Chicago, Ill.
Skidmore Corp., St. Joseph, Mich.
Sta-Rite Products, Inc., Delavan, Wis.
Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Universal Mfg. Co., Berkeley, Calif.
Warren Pumps, Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CONTROLLED VOLUME

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
C C Pump Mfg. Div., Palmyra, N. J.
Dearborn Chemical Co., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Hills-McCanna Co., Chicago, Ill.
Madden Corp., The, Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Wallace & Tiernan, Inc., Belleville, N. J.

PUMPS, DEEP WELL, TURBINE

Advance Pump Co., Berkeley, Calif.
American Well Wks., Aurora, Ill.

Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Davidson Co., M. T., New York, N. Y.
Decatur Pump Co., Decatur, Ill. (shallow well)
Deming Co., Salem, O.
Fairbanks, Morse & Co., Chicago, Ill.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Lancaster Pump & Mfg. Co., Lancaster, Pa. (submersible)
Layne & Bowler, Inc., Memphis, Tenn.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Sta-Rite Products, Inc., Delavan, Wis.
Sumo Pumps, Inc., Stamford, Conn.
Wintroath Pump, Div. of Worthington Corp., Alhambra, Calif.
Worthington Corp., East Orange, N. J.

PUMPS, EVAPORATIVE COOLER

Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Carver Pump Co., Muscatine, Ia.
Chempump Corp., Philadelphia, Pa. (canned motors)
Deming Co., Salem, O.
Essick Mfg. Co., Los Angeles, Calif.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., New York, N. Y.
International Metal Products, Phoenix, Ariz.
Jabsco Pump Co., Burbank, Calif.
Krueger Air Conditioning Co., Tucson, Ariz.
Little Giant Pump Co., Div. of Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Ruthman Machinery Co., Cincinnati, O.
Taco Heaters, Inc., Cranston, R. I.
Tech-Tron Corp., Lawrence, Ks.
Thermador Electrical Mfg., Los Angeles, Calif.
Warren Pumps, Inc., Warren, Mass.
Weinman Pump Mfg. Co., The, Columbus, O.
Wright Mfg. Co., Phoenix, Ariz.

PUMPS, FIRE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Industries, Inc., Belleville, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Layne & Bowler, Inc., Memphis, Tenn.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marlow Pumps, Division of Bell & Gossett Co., Midland Park, N. J.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Royalton Co., Inc., Gasport, N. Y.
Solar Aircraft Co., San Diego, Calif. (gas turbine)
Universal Mfg. Co., Berkeley, Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Pumps, Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Worthington Corp., East Orange, N. J.

PUMPS, GEAR

American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
DeLaval Steam Turbine Co., Trenton, N. J.
Granberg Corp., Oakland, Calif.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich. (hydraulic)
Mechanical Products Corp., Chicago, Ill.
Myers & Bro. Co., F. E., The, Ashland, O.
Northern Ordnance Inc., Subsidiary of Northern Pump Co., Minneapolis, Minn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Roper Corp., Geo. D., Rockford, Ill.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Tuthill Pump Co., Chicago, Ill.
Viking Pump Co., Cedar Falls, Ia.
Warren Pumps, Inc., Warren, Mass.
Webster Electric Co., Racine, Wis.
Worthington Corp., East Orange, N. J.

PUMPS, HIGH PRESSURE, HYDRAULIC

Aldrich Pump Co., Allentown, Pa.
American Engineering Co., Philadelphia, Pa.
American Instrument Co., Inc., Silver Spring, Md.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Autoclave Engineers Sales Corp., Erie, Pa.
Blackhawk Mfg. Co., Milwaukee, Wis.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
C C Pump Mfg. Div., Palmyra, N. J.
Canton Stoker Corp., Canton, O.
Carpenter Valve Corp., The, Cleveland, O. (hand)
Coffin Co., J. S., Jr., Englewood, N. J.
Commercial Shearing & Stamping Co., Youngstown, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Gorman-Rupp Industries, Inc., Belleville, O.
Gray Co., Inc., Minneapolis, Minn.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich.
Kobe Inc., Huntington Park, Calif.
LeCourtenay Co., Newark, N. J.
Ledeen Mfg. Co., El Monte, Calif.
Milton Roy Co., Philadelphia, Pa.
Myers & Bro., Co., F. E. The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
Northern Ordnance Inc., Subsidiary of Northern Pump Co., Minneapolis, Minn.
Nye Tool Co., Chicago, Ill.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roper Corp., Geo. D., Rockford, Ill.
Royalton Co., Inc., Gasport, N. Y.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
United Centrifugal Pumps, Oakland, Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Pumps, Inc., Warren, Mass.
Webster Electric Co., Racine, Wis.
Wilson Co., K. R., Arcade, N. Y.
Worthington Corp., East Orange, N. J.

PUMPS, HYDROSTATIC TEST, HAND-OPERATED

Autoclave Engineers Sales Corp., Erie, Pa.
Deming Co., Salem, O.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Pacific Pumping Co., Oakland, Calif.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.

PUMPS, JET

Advance Pump Co., Berkeley, Calif.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Clayton Mark & Co., Evanston, Ill.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Deming Co., Salem, O.
Duro Co., The, Dayton, O.
Everite Pump & Mfg. Co., Lancaster, Pa.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Myers & Bro. Co., F. E., The, Ashland, O.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Red Jacket Mfg. Co., Davenport, Ia.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Sta-Rite Products, Inc., Delavan, Wis.
Uniflow Mfg. Co., Erie, Pa.
Universal Mfg. Co., Berkeley, Calif.
Whitewater Pump Co., Inc., Whitewater, Wis.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

PUMPS, LIQUID REFRIGERANT CIRCULATING

American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Canton Stoker Corp., Canton, O.
Chempump Corp., Philadelphia, Pa. (canned motors)
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Corley Co., Inc., The, New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Heatron, Inc., York, Pa.
Ingersoll-Rand Co., New York, N. Y.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
LeCourtenay Co., Newark, N. J.
Myers & Bro. Co., F. E., The, Ashland, O.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Universal Mfg. Co., Berkeley, Calif.
Viking Pump Co., Cedar Falls, Ia.
Vilter Mfg. Co., Milwaukee, Wis.
Warren Pumps, Inc., Warren, Mass.
Watkins Co., J. E., Maywood, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

PUMPS, PROPELLER

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Well Works, Aurora, Ill.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Chempump Corp., Philadelphia, Pa.
Everite Pump & Mfg. Corp., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Lawrence Pumps, Inc., Lawrence, Mass.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Ruthman Machinery Co., Cincinnati, O.
Universal Mfg. Co., Berkeley, Calif.
Warren Pumps, Inc., Warren, Mass.
Worthington Corp., East Orange, N. J.

PUMPS, PROPORTIONING

American Instrument Co., Inc., Silver Spring, Md.
Bird-Archer Co., Philadelphia, Pa.
Bruner Corp., Milwaukee, Wis.
C C Pump Mfg. Div., Palmyra, N. J.
Dearborn Chemical Co., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Hills-McCanna Co., Chicago, Ill.
Madden Corp., The, Chicago, Ill.
Marco Co., Inc., Saginaw, Mich.
Mechanical Products Corp., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Pacific Pumping Co., Oakland, Calif.

Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Robbins & Myers, Inc., Springfield, O.
Texstream Corp., Houston, Tex.
Universal Mfg. Co., Berkeley, Calif.
Vanton Pump & Equipment Corp., Hillside, N. J.
Wallace & Tiernan Inc., Belleville, N. J.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Rubber and Rubber lined)
American-Marsh Pumps, Inc., Battle Creek, Mich.
Barnes Mfg. Co., Mansfield, O.
C C Pump Mfg. Div., Palmyra, N. J.
Canton Stoker Corp., Canton, O.
Clayton Mark & Co., Evanston, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dearborn Chemical Co., Chicago, Ill.
Deming Co., Salem, O.
Duro Co., Dayton, O.
Everite Pump & Mfg. Corp., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gray Company, Inc., Minneapolis, Minn.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Ledeen Mfg. Co., El Monte, Calif.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Milton Roy Co., Philadelphia, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
Novo Pump and Engine Co., Lansing, Mich.
Red Jacket Mfg. Co., Davenport, Ia.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Royalton Co., Inc., Gasport, N. Y.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co.. Battle Creek, Mich.
Warren Pumps, Inc., Warren, Mass.
Whitewater Pump Co., Inc., Whitewater, Wis.
Worthington Corp., East Orange, N. J.

PUMPS, ROTARY

American Engineering Co., Philadelphia, Pa.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Rubber and rubber lined)
Beach-Russ Co., New York, N. Y.
Becher Pump Co., Chicago, Ill.
Binks Mfg. Co., Chicago, Ill.
Blackmer Pump Co., Grand Rapids, Mich.
Chicago Pneumatic Tool Co., New York.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eco Engineering Co., Newark, N. J.
Eisler Engineering Co., Inc., Newark, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Granberg Corp., Oakland, Calif.
Hauck Mfg. Co., Brooklyn, N. Y.
Jabsco Pump Co., Burbank, Calif.
Kinney Mfg. Div., The New York Air Brake Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leiman Bros., Inc., Newark, N. J.
Lindquist Pump Corp., Culver City, Calif.
Madden Corp., Chicago, Ill.
Marco Co., Inc., Saginaw, Mich.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Nash Engineering Co., South Norwalk, Conn.
Northern Ordnance Inc., Subsidiary of Northern Pump Co., Minneapolis, Minn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Procon Pump & Engineering Co., Oak Park, Mich.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sethco Mfg. Co., Merrick, N. Y. (with filter for acids)
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Sumo Pumps, Inc., Stamford, Conn.
Sundstrand Hydraulic Div., Rockford, Ill. (for oil burners high and low pressure)
Sutorbilt Corp., Subsidiary of Fuller Co., Compton, Calif.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Ulrich Mfg. Co., Bump Pump Div., Roanoke, Ill.
Vanton Pump and Equipment Corp., Hillside, N. J.
Viking Pump Co., Cedar Falls, Ia.
Warren Pumps, Inc., Warren, Mass.
Waukesha Foundry Co., Waukesha, Wis.
Webster Electric Co., Racine, Wis. (unit pump for oil burners)
Worthington Corp., East Orange, N. J.
Yale & Towne Mfg. Co., White Plains, N. Y.

PUMPS, SEWAGE AND SLUDGE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Becher Pump Co., Chicago, Ill.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Canton Stoker Corp., Canton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
DeLaval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Industries, Inc., Belleville, O.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Lawrence Pumps, Inc., Lawrence, Mass.
Marlow Pumps, Division of Bell & Gossett Co., Midland Park, N. J.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Robbins & Myers, Inc., Springfield, O.
Swaby Mfg. Co., Chicago, Ill.
Universal Mfg. Co., Berkeley, Calif.
Warren Pumps, Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, SEWAGE AND SLUDGE, SUBMERSIBLE

American Well Wks., Aurora, Ill.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Chicago Pneumatic Tool Co., New York.
Fairbanks, Morse & Co., Chicago, Ill.
Ferro Corp., Cleveland, O. (Compressed air operated)
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lawrence Pumps, Inc., Lawrence, Mass.
Pacific Pumping Co., Oakland, Calif.
Universal Mfg. Co., Berkeley, Calif.
Weil Pump Co., Chicago, Ill.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Canton Stoker Corp., Canton, O.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Gardner-Denver Co., Quincy, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
National Steam Pump Co., Upper Sandusky, O.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Union Steam Pump Co., Battle Creek, Mich.
Universal Mfg. Co., Berkeley, Calif.
Warren Pumps, Inc., Warren, Mass.
Worthington Corp., East Orange, N. J.

PUMPS, SUMP

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.
Barrett Haentjens & Co., Hazleton, Pa.
Bruner Corp., Milwaukee, Wis.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Chicago Pneumatic Tool Co., New York.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
Dayton Electric Mfg. Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
Duro Co., Dayton, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Corp., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Friermood Machine Works, Converse, Ind.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Industries, Inc., Belleville, O.
Goulds Pump, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Kenco Pump Div., American Crucible Products Co., Lorain, O.
Kol-Master Corp., Oregon, Ill
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lawrence Pumps, Inc., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Layne & Bowler, Inc., Memphis, Tenn.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Marlow Pumps, Division of Bell & Gossett Co., Midland Park, N. J.
Metalmaster Corp., Newark, N. J.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div., Chase Brass & Copper Co., Waterbury, Conn.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Inc., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Radiant Utilities Corp., Brooklyn, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Reif-Rexoil, Inc., Buffalo, N. Y.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sethco Mfg. Co., Merrick, N. Y. (all plastic)
Skidmore Corp., St. Joseph, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Thor Power Tool Co., Chicago, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanton Pump & Equipment Corp., Hillside, N. J.
Warren Pumps, Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whitewater Pump Co., Inc., Whitewater, Wis.

Wintroath Pumps, Div. of Worthington Corp., Alhambra, Calif.
Wire Products Co., Baltimore, Md.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, SUMP, SUBMERSIBLE

Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Bruner Corp., Milwaukee, Wis.
Buffalo Pumps, Div of Buffalo Forge Co., Buffalo, N. Y.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Dayton Electric Mfg. Co., Chicago, Ill
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
Everite Pump & Mfg. Corp., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Kenco Pump Div., American Crucible Products Co., Lorain, O.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lawrence Pumps, Inc., Lawrence, Mass.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Pacific Pumping Co., Oakland, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Swaby Mfg. Co., Chicago, Ill.
Weil Pump Co., Chicago, Ill.
Whitewater Pump Co., Inc., Whitewater, Wis.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.
Worthington Corp., East Orange, N. J.

PUMPS, TURBINE TYPE

Advance Pump Co., Berkeley, Calif.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Coffin Co., J. S., Jr., Englewood, N. J.
Decatur Pump Co., Decatur, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
General Tire & Rubber Co., Akron, O.
Ingersoll-Rand Co., New York, N. Y.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chem. Corp., Los Angeles, Calif.
Roth Co., Roy E., Rock Island, Ill.
Skidmore Corp., St. Joseph, Mich.
Sta-Rite Products, Inc., Delavan, Wis.
Universal Mfg. Co., Berkeley, Calif.
Wintroath Pumps, Div. of Worthington Corp., Alhambra, Calif.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Corp., East Orange, N. J.

PUMPS, VACUUM

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Barrett Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Canton Stoker Corp., Canton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eisler Engineering Co., Inc., Newark, N. J.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
General Ceramics Corp., Keasbey, N. J. (Chemical)
Granberg Corp., Oakland, Calif.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Joy Mfg. Co., Pittsburgh, Pa.
Kinney Mfg. Div., The New York Air Brake Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leiman Bros., Inc., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oxygen Equipment & Service Co., Chicago, Ill.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Research Vacuum Supply Co., Chicago, Ill.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skidmore Corp., St. Joseph, Mich.
Sutorbilt Corp., Subsidiary of Fuller Co., Compton, Calif.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Will Corp., Rochester, N. Y.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, VACUUM HEATING

American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Barnes & Jones, Inc., Newtonville, Mass.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T.. New York, N. Y.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Faber Engineering Co., Inc., Philadelphia, Pa.
Gardner-Denver Co., Quincy, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Sarco Co., Inc., New York, N. Y.
Skidmore Corp., St. Joseph, Mich.
Sterling, Inc., Milwaukee, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Pumps, Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., East Orange, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Buffalo Pumps, Div. of Buffalo Forge Co., Buffalo, N. Y.
C C Pump Mfg. Div., Palmyra, N. J.
Canton Stoker Corp., Canton, O.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Eagan Co.. Inc., Walter H., Philadelphia, Pa.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Ferro Corp., Cleveland, O. (compressed air operated)
Foster Pump Wks., Inc., Brooklyn, N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Granberg Corp., Oakland, Calif.
Gray Co., Inc., Minneapolis, Minn.
Hetherington & Berner, Inc., Indianapolis, Ind. (jacketed)
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Div., The New York Air Brake Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Lawrence Pumps, Inc., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Madden Corp., The, Chicago, Ill.
Marco Co., Inc., Saginaw, Mich.
Milton Roy Co., Philadelphia, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Rockwell Co., W. S., Fairfield, Conn.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Royalton Co., Inc., Gasport, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Ulrich Mfg. Co., Bump Pump Div., Roanoke, Ill.
Union Steam Pump Co., Battle Creek, Mich.
United Centrifugal Pumps, Oakland, Calif.
Universal Mfg. Co., Berkeley, Calif.
Vanton Pump & Equipment Corp., Hillside, N. J.
Viking Pump Co., Cedar Falls, Ia.
Warren Pumps, Inc., Warren, Mass.
Weinman Pump Mfg. Co., Columbus, O.
Wheeler Mfg. Co., C. H., Economy Pump Div., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., East Orange, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUNCHES, SHEET METAL

Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
Cleveland Punch & Shear Wks. Co., Cleveland, O.
Diamond Machine Tool Co., Pico, Calif.
Duro-Dyne Corp., New Hyde Park, L. I., N. Y.
Duro Metal Products Co., Chicago, Ill.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Hendley & Whittemore Co., Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Leslie Welding Co., Inc., Chicago, Ill.
M-M-A, Inc., Lancaster, Pa.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Nye Tool Co., Chicago, Ill.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Reiner & Campbell Co., Inc., Newark, N. J.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Thor Tool & Die Co., San Leandro, Calif.
Webb Corp., The, Webb City, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Weidemann Machine Co., Philadelphia, Pa.
Zeh & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Recony Corp., New York, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Giant Mfg. Co., Council Bluffs, Ia.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Mercury Hydraulics, Inc., Denver, Colo.
Wilson Co., K. R., Arcade, N. Y.

RACKS, STORAGE, PIPE

Acme Steel Co., Chicago, Ill. (slotted angle)
Adams Co., The, Dubuque, Ia.
Beaver Advance Corp., Ellwood City, Pa.
Berger Div., Republic Steel Corp., Canton, O.
Bernard-Franklin Co., Inc., Philadelphia, Pa.
California Steel Products Div., Richmond, Calif.
Haertel Co., Walter, Minneapolis, Minn.
Industrial Tubular Equipment Co., North Hollywood, Calif.
Modern Hanger Corp., The, Cleveland, O.
Mult-A-Frame Div., Ainsworth Mfg. Corp., Detroit, Mich.
Palmer-Shile Co., Detroit, Mich.
Republic Steel Corp., Cleveland, O.
Steel City Electric Co., Pittsburgh, Pa.
Unistrut Products Co., Chicago, Ill.
XXth Century Heating & Ventilating Co., The, Akron, O.

RADIANT HEAT MEASUREMENT

See Radiometers

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIANT HEATING AND COOLING

See Coils and Panels, Radiant Heating, Prefabricated

RADIANT HEATING ELECTRICAL CONDUCTORS

See Conductors, Electrical, for Radiant Heating

RADIATION, BASEBOARD, ELECTRIC HEATING ELEMENT

Berko Electric Mfg. Corp., Queens Village, N. Y.
Ceilheat, Inc., Knoxville, Tenn.
Circle Air Industries, Inc., Brooklyn, N. Y.
Electriliving Corp., Indianapolis, Ind.
Electro Products Mfg. Co., Vancouver, Wash.
General Alliance Corp., San Diego, Calif.
General Electric Co., Wiring Device Dept., Providence, R. I.
Heatmore, Inc., Brooklyn, N. Y.
Modernheat Cable Corp., Kingsport, Tenn.
Roberson, Inc., Seattle, Wash.
Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Spartan Convector Co., Inc., Maspeth, N. Y.
Sunwarm, Inc., Kingsport, Tenn.
Vulcan Radiator Co., Hartford, Conn.
Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., E. L., Pittsburgh, Pa.

RADIATION, BASEBOARD, FERROUS

American Radiator & Standard Sanitary Corp., New York, N. Y.
Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Burnham Corp., Irvington, N. Y.
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Farrell Associates, Charles, Valencia, Pa.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
National-U. S. Radiator Corp., Johnstown, Pa.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Sterling Radiator Co., Inc., Westfield, Mass.
Trane Co., The, La Crosse, Wis.
Tranter Mfg., Inc., Lansing, Mich.
Utica Radiator Corp., Utica, N. Y.
Vulcan Radiator Co., Hartford, Conn.
Weil-McLain Co., Michigan City, Ind.

RADIATION, BASEBOARD, FITTINGS

For special fittings, see Fittings, Pipe, Special, for Baseboard Radiation

RADIATION, BASEBOARD, NON-FERROUS

American Radiator & Standard Sanitary Corp., New York, N. Y.
Argo Industries, Inc., Hartford, Conn.
Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Beacon-Morris Corp., Boston, Mass.
Brown Products Corp., Union, N. J.
Columbia Boiler Company of Pottstown, Pottstown, Pa.
Convector Corp., Washington, D. C.
Crane Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Ejay Baseboard Mfg. Co., Winsted, Conn.
Embassy Steel Products, Inc., Brooklyn, N. Y.
Farrell Associates, Charles, Valencia, Pa.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Federal Boiler Co., Inc., Midland Park, N. J.
General Automatic Products Corp., Baltimore, Md.
General Heating Products Co., Philadelphia, Pa.
Hoff Mfg. Co., Bethany, New Haven, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hydrotherm, Inc., Northvale, N. J.
I. W. Air Conditioning Corp., New York, N. Y.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Patco Mfg. Co., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Radiant Baseboard Panels, Inc., Newington, Conn.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Rempe Co., Chicago, Ill.
Republic Products Co., Philadelphia, Pa.
Rittling Corp., Buffalo, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Spartan Convector Co., Inc., Maspeth, N. Y.
Stedco Products, Wilkes-Barre, Pa.
Sterling Radiator Co., Inc., Westfield, Mass.
Tenney Engineering, Inc., Union, N. J.
Trane Co., The, La Crosse, Wis.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.
Young Radiator Co., Racine, Wis.

RADIATION, CONVECTION TYPE, ELECTRIC HEATING ELEMENT

Circle-Air Industries, Inc., Brooklyn, N. Y.
Crystalheat Co., Van Nuys, Calif.
Electriliving Corp., Indianapolis, Ind.
Electromode Div. of Commercial Controls Corp., Rochester, N. Y.
Electro-Products Mfg. Co., Vancouver, Wash.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Meier Elec. & Mach. Co., Inc., Indianapolis, Ind.
Modernheat Cable Corp., Kingsport, Tenn.
National-U. S. Radiator Corp., Johnstown, Pa.
Spartan Convector Co., Inc., Maspeth, N. Y.
Sundial Electric Co., Richmond Hill, N. Y.
Sunwarm, Inc., Kingsport, Tenn.
Thermador Electrical Mfg., Los Angeles, Calif.
Vulcan Radiator Co., Hartford, Conn.
Wesix Electric Heater Co., San Francisco.
Wiegand Co., Edwin L., Pittsburgh, Pa.

RADIATION, CONVECTION TYPE, FERROUS

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Auburn Burner Co., Auburn, Ind.
Brown Products Corp., Union, N. J.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Embassy Steel Products, Inc., Brooklyn, N. Y.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Murray Mfg. Co., D. J., Wausau, Wis.
Nation-U. S. Radiator Corp., Johnstown, Pa.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Tranter Mfg., Inc., Lansing, Mich.
Webster & Co., Warren, Camden, N. J.

RADIATION, CONVECTION TYPE, NON-FERROUS

Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Argo Industries, Inc., Hartford, Conn.
Beacon-Morris Corp., Boston, Mass.
Brown Products Corp., Union, N. J.
Convector Corp., Washington, D. C.
Dunham-Bush, Inc., West Hartford, Conn.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Embassy Steel Products, Inc., Brooklyn, N. Y.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
G & O Mfg. Co., New Haven, Conn.
General Heating Products Co., Philadelphia, Pa.
Hoff Mfg. Co., Bethany, New Haven, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
I. W. Air Conditioning Corp., New York, N. Y.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Modine Mfg. Co., Racine, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt Inc., John J., Philadelphia, Pa.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Patco Mfg. Co., Philadelphia, Pa.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Republic Products Co., Philadelphia, Pa.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Spartan Convector Co., Inc., Maspeth, N. Y.
Tenney Engineering Inc., Union, N. J.
Trane Co., The, La Crosse, Wis.
Vapor Heating Corp., Chicago, Ill.
Webster & Co., Warren, Camden, N. J.
Young Radiator Co., Racine, Wis.

RADIATION, DIRECT

American Radiator & Standard Sanitary Corp., New York, N. Y.
Burnham Corp., Irvington, N. Y.
Clow & Sons, Inc., James B., Chicago, Ill. (Gas fired)
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Murray Mfg. Co., D. J., Wausau, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Rittling Corp, The, Buffalo, N. Y.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Michigan City, Ind.
Wilson Engineering Corp., Chicago, Ill.

RADIATION, FIN TUBE TYPE

Alstrom Corp., New York, N. Y.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Argo Industries, Inc., Hartford, Conn.
Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Brown Products Corp., Union, N. J.
Convector Corp., Washington, D. C.
Crane Co., Chicago, Ill.
Crystalheat Co., Van Nuys, Calif.
Drayer-Hanson, Div. of National U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
Electro-Products Mfg. Co., Vancouver, Wash.
Embassy Steel Products, Inc., Brooklyn, N. Y.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
G & O Mfg. Co., New Haven, Conn.
General Automatic Products Corp., Baltimore, Md.
General Heating Products Co., Philadelphia, Pa.
Hoff Mfg. Co., Bethany, New Haven, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hydrotherm, Inc., Northvale, N. J.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
Moore Dry Kiln Co., Jacksonville, Fla.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., Johnstown, Pa.
Peerless of America, Inc., Chicago, Ill.
Radiant Baseboard Panels, Inc., Newington, Conn.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Stedco Products, Wilkes-Barre, Pa.
Sterling Radiator Co., Inc., Westfield, Mass.
Super Radiator Corp., Minneapolis, Minn.
Trane Co., The, La Crosse, Wis.
Vapor Heating Corp., Chicago, Ill.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.
York-Shipley, Inc., York, Pa.

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, ELECTRIC

Burnham Corp., Irvington, N. Y. (portable steam)
Crystalheat Co., Van Nuys, Calif.
Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Spartan Convector Co., Inc., Maspeth, N. Y.
ThermoRay Corp., Newark, N. J.
Trent, Inc., Philadelphia, Pa.
Vulcan Radiator Co., Hartford, Conn.

RADIATORS, GAS FIRED

Fedders-Quigan Corp., Heating Div., Trenton, N. J.

RADIATORS, HUMIDIFYING

Murray Mfg. Co., D. J., Wausau, Wis.

RADIOACTIVE ISOTOPES FOR DETECTING LEAKS IN PIPING AND HEATING SYSTEMS

See Isotopes, Radioactive

RADIOGRAPHIC INSPECTION

See Equipment, Radiographic Inspection

RADIOMETERS, THERMAL, FOR RADIANT HEAT MEASUREMENTS

Beckman & Whitley, Inc., San Carlos, Calif.

RATCHET WRENCHES

See Wrenches, Ratchet

REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Greenfield Tap & Die Corp, Greenfield, Mass.
Holub Industries, Inc., Sycamore, Ill.
Mueller Co., Decatur, Ill.
Nye Tool Co., Chicago, Ill.
Reed Mfg Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Thor Power Tool Co., Chicago, Ill.
Toledo Pipe Threading Machine Co., Toledo, O.

RECEIVERS, REFRIGERANT, LIQUID

Acme Industries, Inc., Jackson, Mich.
California Steel Products, Div. of Yuba Consolidated Industries, Inc., Richmond, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Killebrew Engineering Corp., St. Louis, Mo.
Refrigeration Research, Inc., Brighton, Mich.
Remco, Inc., Zelienople, Pa.
Tube Manifold Corp., North Tonawanda, N. Y.
Watkins Co., J. E., Maywood, Ill.
Worthington Corp., East Orange, N. J.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Partlow Corp., The, New Hartford, N. Y.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Serdex, Inc., Boston, Mass.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

RECORDER-CONTROLLERS, HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Serdex, Inc., Boston, Mass.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

RECORDER-CONTROLLERS, PRESSURE

American Meter Co., Inc., Philadelphia, Pa.
Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Daytronic Corp., Dayton, O.
Defender Instrument and Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Controls Co., Glendale, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Heat-Timer Corp., New York, N. Y.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Power Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals Inc., Sellersville, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

RECORDER-CONTROLLERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Defender Instrument and Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Controls Co., Glendale, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Heat-Timer Corp., New York, N. Y
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Partlow Corp., The, New Hartford, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thermo Electric Co., Inc., Saddle Brook, N. J.
Thwing-Albert Instrument Co., Philadelphia.

Tipp Manufacturing Co., Tipp City, O.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals Inc., Sellersville, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
West Insturment Corp., Chicago, Ill.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

RECORDER-TOTALIZERS, TIME, FOR HEATING SYSTEMS

Au-Temp Co. Corp., New York, N. Y.
Cramer Coutrols Corp., Centerbrook, Conn.
Haydon Co., A. W., The, Waterbury, Conn.
Heat-Timer Corp., New York, N. Y.
Standard Instrument Div., Heat Timer Corp., New York, N. Y.

RECORDERS, CARBON DIOXIDE

Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Defender Instrument and Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.

RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

Abbeon Supply Co., Jamaica, N. Y.
American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments Inc., Chicago, Ill.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati, O.
Partlow Corp., The, New Hartford, N. Y.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

RECORDERS, DEW POINT

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Surface Combustion Corp., Toledo, O.

RECORDERS, DRAFT

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., Boody, Ill.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J .
Victory Engineering Corp., Union, N. J.

RECORDERS, HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weighing & Control Components, Inc., Hatboro, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

RECORDERS, LIQUID LEVEL

Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Simplex Valve & Meter Co., Lancaster, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Yarnall-Waring Co., Philadelphia, Pa.

RECORDERS, OXYGEN

Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Mine Safety Appliances Co., Pittsburgh, Pa.
Victory Engineering Corp., Union, N. J.

RECORDERS, PRESSURE AND VACUUM

American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Crosby Valve & Gage Co., Wrentham, Mass.
Daytronic Corp., Dayton, O.
Defender Instrument & Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Flow Corp., Arlington, Mass.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hastings-Raydist, Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Heat-Timer Corp., New York, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Swartwout Co., The, Cleveland, Ohio
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals Inc., Sellersville, Pa.
Weksler Thermometer Corp., Freeport, N. Y.
Weston Electric Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

RECORDERS, SMOKE DENSITY

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia Pa.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
De-Tec-Tronic Corp., Chicago, Ill.
Edwards, L. V., Rockville Center, N. Y.
Ess Instrument Co., Bergenfield, N. J.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Sterns-Flinn Corp., New York, N. Y.

RECORDERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
American Meter Co., Inc., Philadelphia, Pa.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Defender Instrument & Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Heat-Timer Corp., New York, N. Y.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O. (Mercury-actuated)
Partlow Corp., The, New Hartford, N. Y.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tavlor Instrument Companies, Rochester, N. Y.
Thermo Electric Co., Inc., Saddle Brook, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals Inc., Sellersville, Pa.
Victory Engineering Corp., Union, N. J.
Weksler Thermometer Corp., Freeport, N. Y.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

RECOVERY UNITS, HEAT, AIR TO AIR

See Units, Heat Recovery, Air to Air

REDUCERS AND INCREASERS, SPEED

Abart Gear & Machine Co., Chicago, Ill.
Adams Co., The, Dubuque, Iowa
Ailis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Bodine Electric Co., Chicago, Ill.
Boston Gear Wks., Quincy, Mass.
Brown-Brockmeyer Co., Inc., Dayton, O.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Cleveland Worm & Gear Co., Cleveland, O.
Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich.
De Laval Steam Turbine Co., Trenton, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Falk Corp., Milwaukee, Wis.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Graham Transmissions, Inc., Menomonee Falls, Wis.
Hewitt-Robins, Inc., Stamford, Conn.
Janette Electric Mfg. Co., Morton Grove, Ill.
Jones Machinery Div., Hewitt-Robins, Inc., Chicago, Ill.
Lima Electric Motor Co., Inc., The, Lima, O.
Link Belt Co., Chicago, Ill. (worm gear)
Master Electric Co., Dayton, O.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Reliance Electric & Engineering Co., Cleveland, O.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Star-Kimble Electric Co., Div. of Safety Industries, Inc., Hamden, Conn.
Steam Turbine Div., Worthington Corp., Wellsville, N. Y.
Sterling Electric Motors, Inc., Los Angeles, Calif.
Terry Steam Turbine Co., The, Hartford, Conn.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Worthington Corp., East Orange, N. J.

REFRACTORIES AND REFRACTORY CEMENT

Allen Co., Robert G., Mechanicsville, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Basic Inc., Cleveland, O.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Elraco Engineering Co., Los Angeles, Calif.
France Refractories, Co., J. H., Snow Shoe, Pa.
Green Fire Brick Co., Mexico, Mo.
Johns-Manville, New York, N. Y.
Nebel Mfg. Co., Cleveland, O.
Norton Co., Worcester, Mass.
Plibrico Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc, New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Reintjes Co., Geo. P., Kansas City, Mo.
Rex Clay Products Co., Detroit, Mich.
Rex Roto Corp., Walled Lake, Mich.
Robinson Clay Product Co., The, Akron, O.
Rutland Fire Clay Co., Rutland, Vt.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Standard Fuel Engineering Co., Detroit, Mich.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Zonolite Co., Chicago, Ill.

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT FILTERS

See Filters, Refrigerant

REFRIGERANT GAGE SETS

See Gage Sets, Refrigeration

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANT SLUG ELIMINATORS

See Eliminators, Slug, Refrigerant

REFRIGERANTS

American Potash & Chemical Corp., Aerosol & Refrigeration Div., Los Angeles, Calif. (sulphur dioxide methyl chloride)
Ansul Chemical Co., Refrigeration Div., Marinette, Wis. (methyl, chloride, sulphur dioxide)
Armour and Co., Ammonia Div., Chicago, Ill. (Anhydrous ammonia)
Carrier Corp., Syracuse, N. Y. (carrene)
Dow Chemical Co., The, Midland, Mich.
du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)
du Pont de Nemours & Co., Inc., E. I., Freon Products Div., Wilmington, Del. (fluorinated hydrocarbon refrigerants)
General Chemical Div., Allied Chemical & Dye Corp., New York, N. Y. (R-12 Dichlorodifluoromethane, R-114A Dichlorotetrafluoroethane, R-22 Monochlorodifluoromethane, R-11 Trichloromonofluoromethane, R-113 Trichlorotrifluoroethane)
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill. (carbon dioxide)
Monsanto Chemical Co., St. Louis, Mo. (anhydrous ammonia)
Pennsalt Chemicals Corp., Philadelphia, Pa. (ammonia, fluorinated hydrocarbons) (packaged refrigerants)
Pure Carbonic Co., Div. of Air Reduction Co., Inc., New York, N. Y. (carbon dioxide)
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y. (glycols)
Virginia Smelting Co., West Norfolk, Va., (Methyl chloride, liquid sulphur dioxide.)

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovia, Calif.
Auer Register Co., Cleveland, O.
Austin Engineering & Mfg. Co., Inc., Ysleta, Tex.
Barber-Colman Co., Rockford, Ill.
Bowman Co., D. F., New Albany, Ind.
Carnes Corp., Verona, Wis.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Corbman Bros., Inc., Philadelphia, Pa.
Diamond Mfg. Co., Wyoming, Pa.
Dole Valve Co., The, Morton Grove, Ill. (Automatic register)
Empire Ventilation Equipment Co., Long Island City, N. Y.
General Register Corp., Cedar Grove, N. J.
Harrington & King Perforating Co., Inc., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hastings Air Control, Inc., Omaha, Nebr.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Krueger Air Conditioning Co., Tucson, Ariz.
Lima Register Co., The, Lima, O.
Louvra Mfg. & Sales Co., Union, N. J.
Midco Register Corp., St. Paul, Minn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Kinston, N. C.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Viking Mfg. Corp., Cleveland, O.
Waterloo Register Co., Inc., Waterloo, Ia.
Young Regulator Co., Cleveland, O.

REGISTER UNITS, FOR SECONDARY AIR SUPPLY FOR OIL BURNERS

Engineer Co., New York, N. Y.
Faber Engineering Co., Inc., Philadelphia, Pa.
National Airoil Burner Co., Inc., Philadelphia, Pa.

REGULATORS, AIR VELOCITY

Ace Instrument Co., Inc., Brooklyn, N. Y.
Barber-Colman Co., Rockford, Ill.
Hastings-Raydist, Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Johnson Service Co., Milwaukee, Wis.
Taylor Instrument Companies, Rochester, N. Y.
Thermal Agency, Houston, Tex.

REGULATORS, DAMPER SETS

Ace Instrument Co., Inc., Brooklyn, N. Y.
Acme Mfg. Co., Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
Air Conditioning Products Co., Detroit, Mich.
Ashcraft Co., J. P., Dallas, Tex.
Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Defender Instrument & Regulator Co., Boody, Ill.
Detroit Controls Corp., Detroit, Mich.
Duro-Dyne Corp., New Hyde Park, L. I., N. Y.
Elgen Mfg. Co., Long Island City, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Foster Wheeler Corp., New York, N. Y.
General Controls Co., Glendale, Calif. and Skokie, Ill. (electric)
Gerett Corp., M. A., Milwaukee, Wis.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hart & Cooley Mfg. Co., Holland, Mich.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Mirror Patented Stove Pipe Co., Hartford, Conn.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Thermal Agency, Houston, Tex.
United States Register Co., Battle Creek, Mich.
Wa-Trol, Houston, Tex.
Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Ace Instrument Co., Inc., Brooklyn, N. Y.
Askania Regulator Co., Chicago, Ill.
Automatic Devices Co., Inc., Western Springs, Ill.
Bressler Engineering Service, Oregon, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cash Co., A. W., Decatur, Ill.
Cleveland Controls, Inc., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Combustion Equipment Co., Moline, Ill.

Defender Instrument and Regulator Co., Boody, Ill.
Engineer Co., New York, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Foxboro Co., Foxboro, Mass.
Fuel Reduction Corp., Chicago, Ill.
Fuelguard Co., Dallas, Tex.
General Controls Co., Glendale, Calif.
Hays Corp., The, Michigan City, Ind.
Kol-Master Corp., Oregon, Ill.
Krueger Sentry Gauge Co., Green Bay, Wis.
Leahy Mfg. Co., Los Angeles, Calif.
Locke Regulator Co., Salem, Mass.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Mirror Patented Stove Pipe Co., Hartford Conn.
Nichols Instrument Co., Baltimore, Md.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Markesan, Wis.
Simplex Mfg. Co., Fond du Lac, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Steinen Mfg. Co., Wm., Newark, N. J.
Walker Mfg. & Sales Co., St. Joseph, Mo.
Webster Engineering Co., Tulsa, Okla.
Worner Electronic Devices, Rankin, Ill.

REGULATORS, FLUID FLOW, FOR CONSTANT VOLUME

Independent of Pressure

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Askania Regulator Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Binks Mfg. Co., Chicago, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Brooks Rotameter Co., Lansdale, Pa.
Cla-Val Co., Newport Beach, Calif.
Dole Valve Co., The, Morton Grove, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hays Corp., Michigan City, Ind.
Henszey Co., Watertown, Wis.
Kates Co., W. A., The, Deerfield, Ill.
Klipfel Valves, Inc., Hamilton, O.
McDonnell & Miller, Inc., Chicago, Ill.
Taco Heaters, Inc., Cranston, R. I.
Watkins Co., J. E., Maywood, Ill.

REGULATORS, LEVEL, LIQUID

Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Askania Regulator Co., Chicago, Ill.
Associated Valve & Engineering Co., Chicago, Ill.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Burrows Mfg. Co., F. A., York, Pa.
Cla-Val Co., Newport Beach, Calif.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dietz Co., Henry G., Long Island City, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Valve and Regulator Co., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Henszey Co., Watertown, Wis.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Instruments, Inc., Tulsa, Okla.
Johnson Corp., The, Three Rivers, Mich.
Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Petrometer Corp., Long Island City, N. Y.
Phillips & Co., H. A., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Spence Engineering Co., Inc., Walden, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Stickle Steam Specialties Co., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
United Electric Controls Co., Watertown, Mass.
Watts Regulator Co., Lawrence, Mass.

REGULATORS, PRESSURE, AIR

Ace Instrument Co., Inc., Brooklyn, N. Y.
Allen-Bradley Co., Milwaukee, Wis.
American Flow Control Corp., Houston, Tex.
American Meter Co., Inc., Philadelphia, Pa.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Binks Mfg. Co., Chicago, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia.
Burrows Mfg. Co., F. A., York, Pa.
CCA Products, Inc., Glendale, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gardner-Denver Co., Quincy, Ill.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif.
Gray Co., Inc., Minneapolis, Minn.
Grove Valve and Regulator Co., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hanna Engineering Wks., Chicago, Ill.
Hannifin Corp., DesPlaines, Ill.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Nielan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
National Cylinder Gas Co., Chicago, Ill.
Newark Controls Co., Bloomfield, N. J.
Nielsen, Inc., E. V., Stamford, Conn.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., Norwalk, Conn.
Penn Controls, Inc., Goshen, Ind.
Perfecting Service Co., Charlotte, N. C.
Powers Regulating Co., Skokie, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Research Vacuum Supply Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sall Bros. Co., Rockford, Ill.
Schade Valve Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Markesan, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Burlington, Mass.
Squires Co., C. E., The, Cleveland, O.
Strong, Carlisle & Hammond, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Universal Controls Corp., Dallas, Tex.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Warren Engineering Co., Broadway, N. J.
Water Cooling Corp., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Young Regulator Co., Cleveland, O.

REGULATORS, PRESSURE, GAS

Ace Instrument Co., Inc., Brooklyn, N. Y.
Allen-Bradley Co., Milwaukee, Wis.
American Flow Control Corp., Houston, Tex.
American Meter Co., Inc., Philadelphia, Pa.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Deutsch Co., The, Los Angeles, Calif.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Grove Valve and Regulator Co., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.

Harris Calorific Co., The, Cleveland, O.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
K-G Equipment Co., Allentown, Pa.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Maxitrol Co., Detroit, Mich.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
National Cylinder Gas Co., Chicago, Ill.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Penn Controls, Inc., Goshen, Ind.
Ranco Inc., Columbus, O.
Refrigerating Specialties Co., Chicago, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Research Vacuum Supply Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Markesan, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Strong, Carlisle & Hammond, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
Universal Controls Corp., Dallas, Tex.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Weldit, Inc., Detroit, Mich.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

Bailey Co., Chas., M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Defender Instrument and Regulator Co., Boody, Ill.
Detroit Controls Corp., Detroit, Mich.
Fisher Governor Co., Marshalltown, Ia.
Hays Corp., The, Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Mueller Co., Decatur, Ill.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.
White-Rodgers Co., St. Louis, Mo.

REGULATORS, PRESSURE, LIQUID

Allen-Bradley Co., Milwaukee, Wis.
American Flow Control Corp., Houston, Tex.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Binks Mfg. Co., Chicago, Ill.
Blackmer Pump Co., Grand Rapids, Mich.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Newport Beach, Calif.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eddington Metal Specialty Co., Eddington, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Gray Co., Inc., Minneapolis, Minn.
Grove Valve and Regulator Co., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Johnson Service Co., Milwaukee, Wis.
Jordan Corp., Div. of OPW Corp., Cincinnati.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Myers & Bro. Co., F. E., The, Ashland, O.
Norgren Co., C. A., Englewood, Colo.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Boston, Mass. (industrial)
Schade Valve Mfg. Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Strong, Carlisle & Hammond, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown Mass.
Warren Engineering Co., Broadway, N. J.
Water Cooling Corp., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
White-Rodgers Co., St. Louis, Mo.
Williams Gauge Co., Inc., The, Pittsburgh, Pa. (Feed water)

REGULATOR, STATIC PRESSURE, AIR DUCT

Ace Instrument Co., Inc., Brooklyn, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Dietz Co., Henry G., Long Island City, N. Y.
General Controls Co., Glendale, Calif.
Hays Corp., Michigan City, Ind.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Shallcross Controls, Inc., Markesan, Wis.
Weston Electrical Instrument Co., A Subsidiary of Daystrom, Inc., Newark, N. J.

REGULATORS, TEMPERATURE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Aerco Corp., Northvale, N. J.
Allen-Bradley Co., Milwaukee, Wis.
American Instrument Co., Inc., Silver Spring, Md.
Assembly Products, Inc., Chesterland, O.
Atlas Valve Co., Newark, N. J.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Burling Instrument Co., Air Conditioning Div., Chatham, N. J.
Cash Co., A. W., Decatur, Ill.
Century Instrument Co., Detroit, Mich.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument and Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
Eclipse Fuel Engineerig Co., Rockford, Ill.
Fenwal Inc., Ashland, Mass.
Fischer & Porter Co., Hatboro, Pa.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Appliance Control Dept., Morrison, Ill.
H-B Instrument Co., Philadelphia, Pa.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Heat-Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Klipfel Valves, Inc., Hamilton, O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McAlear Mfg. Co., Chicago, Ill.
McCorkle Co., D. H., Berkeley, Calif.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Partlow Corp., The, New Hartford, N. Y.
Penn Controls, Inc., Goshen, Ind.
Philadelphia Thermometer Co., Philadelphia.
Powers Regulator Co., Skokie, Ill.

Ranco Inc., Columbus, O.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc, New York, N. Y.
Scaico Controls Inc., Delanco, N. J.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Squires Co., C. E. The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watkins Co., J. E., Maywood, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Wheelco Instruments Co., Chicago, Ill.
White-Rodgers Co., St. Louis, Mo. (Hydraulic-Action)

REGULATORS, VACUUM

Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hubbell Corp., Mundelein, Ill.
Johnson Service Co., Milwaukee, Wis.
Penn Controls, Inc., Goshen, Ind.

RELAYS, ELECTRICAL

A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J. (time delay)
Advance Relays, Product of Electronics Div., Elgin National Watch Co., Elgin, Ill.
Aemco Inc., Mankato, Minn.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
American Instrument Co., Inc., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Assembly Products, Inc., Chesterland, O.
Automatic Switch Co., Florham Park, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Baso, Inc., Milwaukee, Wis.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bristol Co., The, Waterbury, Conn.
Burke Engineering, Los Angeles, Calif.
Clark Controller Co., Cleveland, O.
Consolidated Metal Products Corp., Albany, N. Y.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Daytronic Corp., Dayton, O.
Deltron, Inc., Philadelphia, Pa.
Detroit Controls Corp., Detroit, Mich.
Ebert Electronics Corp., Queens Village, N. Y.
Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., West Orange, N. J.
Electro-Switch & Controls, Inc., Culver City, Calif.
Ess Instrument Co., Bergenfield, N. J.
Essex Wire Corp., Ft. Wayne, Ind.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Electric Co., Appliance Control Dept., Morrison, Ill.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., The, Hartford, Conn.
Haydon Co., A. W., Waterbury, Conn.
Heinemann Electric Co., Trenton, N. J.
International Business Machines Corp., New York, N. Y.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monitor Controller, Rockland, Mass.
National Time & Signal Corp., Detroit, Mich.
Penn Controls, Inc., Goshen, Ind.
Philadelphia Thermometer Co., Philadelphia.
Potter & Brumfield Sales Co., Inc., Princeton, Ind.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Simpson Electric Co., Chicago, Ill.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass. (motor starting relays)
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Pitman, N. J.
Synchro-Start Products, Inc., Skokie, Ill.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Heating Corp., Chicago, Ill.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Wheelock Signals, Inc., Long Branch, N. J.
White-Rodgers Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

RELAYS, PNEUMATIC

Allen-Bradley Co., Milwaukee, Wis.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Trerice Co., H. O., Detroit, Mich.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Economy Valve Seat Co., Chicago, Ill.
Hammett Electric Mfg. Co., Kansas City, Mo.
Leavitt Machine Co., Orange, Mass.
Skinner Co., M. B., South Bend, Ind.
Standard Reseater Co., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Thor Power Tool Co., Chicago, Ill.

RETURN BENDS

See Bends, Pipe, Return

REVERSE REFRIGERATION CYCLE UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

RINGS, BACKING, FOR PIPE WELDING

Alco Products, Inc., Schenectady, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Arcos Corp., Philadelphia, Pa.
General Ceramics Corp., Keasbey, N. J.
Grinnell Co., Inc., Providence, R. I.
Midwest Piping Co., Inc., St. Louis, Mo.
Robvon Backing Ring Co., Elizabeth, N. J.
Stainless Processing Div., Wall Colmonoy Corp., Detroit, Mich.
Tube Turns, A Div. of National Cylinder Gas Co., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

RINGS, PISTON, FOR COMPRESSORS

Koppers Company, Inc., Metal Products Div., Baltimore, Md.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Corp., Hagerstown, Ind.
Sealed Power Corp., Muskegon, Mich.

ROD, GAS WELDING

Air Reduction Co., Inc., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
American Steel & Wire Div., United States Steel, Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Crucible Steel Co. of America, Pittsburgh, Pa.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Corp., Flushing, N. Y.
International Nickel Co., The, New York, N. Y.
K-G Equipment Co., Allentown, Pa.
Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Metal & Thermit Corp., Rahway, N. J.
Mir-O-Col Alloy Co., Los Angeles, Calif. (for hard facing)
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Revere Copper and Brass, Inc., New York, N. Y.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Weldit, Inc., Detroit, Mich.
Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOF COOLERS

See Systems, Roof Spraying

ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

ROOF VENTILATORS

See Ventilators, Roof

ROOM HUMIDIFIERS

See Humidifiers, Unit, Room Type; and Units, Air Conditioning, Winter

ROOM THERMOSTATS

See Thermostats, Room or Wall

ROTARY PUMPS

See Pumps, Rotary

RUBBER BELTING

See Belting, Flat, Rubber

RUBBER PACKING

See Packing, Rubber and Synthetic

RUBBER PIPE

See Pipe, Hard Rubber

SADDLE VALVES

See Valves, Saddle

SADDLE TEES

See Fittings, Pipe, Saddle Tee

SADDLES FOR PIPE

See Fittings, Pipe, Saddle Tee

SAFETY VALVES
See Valves, Safety, Steam

SALAMANDERS
See Heaters, Air, Direct Fired, Portable

SAWS, ELECTRIC, PORTABLE
Albertson & Co., Inc., Sioux City, Ia.
Black & Decker Mfg. Co., The, Towson, Md.
Eveready Briksaw Co., Kansas City, Mo. (for concrete)
Fenway Machine Co., Philadelphia, Pa. (sheet metal)
Ingersoll-Rand Co., New York, N. Y.
Key-Hak Div., Producers & Distributors, Inc., Allentown, Pa.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Oster Mfg. Co., John, Milwaukee, Wis.
Portable Electric Tools, Inc., Chicago, Ill.
Porter-Cable Machine Co., Syracuse, N. Y.
R C S Tool Corp., Bloomington, Ill.
Speedway Mfg. Co., Div. of Thor Power Tool Co., Chicago (Cicero), Ill.
Stanley Works, The, New Britain, Conn.
Syntron Co., Homer City, Pa.
Thor Power Tool Co., Chicago, Ill.
United States Electrical Tool Co., Cincinnati, O.
Wallace Supplies Mfg. Co., Chicago, Ill. (for abrasive materials)

SCAFFOLDS, PORTABLE
American Ladder & Scaffold Co., Inc., Miami, Fla.
Beaver-Advance Corp., Ellwood City, Pa.
Waco Steel Scaffolding, Inc., Waco, Tex.

SCALE CONTROL
See Devices, Electrolytic; Treatment, Steam System; Treatment, Water

SCALE REMOVAL, CHEMICAL SERVICE FOR
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Ferr-X Corp., Clifton, N. J.
Brown-Electro Co., Oklahoma City, Okla. **(electrolytic protector)**
Calgon Co., Pittsburgh, Pa.
Chemical Solvent Co., Birmingham, Ala.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
North American Mogul Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.

SCOOPS, AIR, FOR DEFLECTING FLOW IN DUCTS
Cain Mfg. Co., Birmingham, Ala.
General Register Corp., Cedar Grove, N. J.
Stewart Mfg. Co., Inc., Kinston, N. C.
Titus Mfg. Corp., Waterloo, Ia.
Waterloo Register Co., Inc., Waterloo, Ia.

SCREENS, SUN REFLECTING
Kaiser Aluminum & Chemical Sales, Inc., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Reflectal Corp. Subsid., Borg-Warner Corp., Chicago, Ill.

SCREWS, SHEET METAL
Allmetal Screw Products Co., Inc., Garden City, Long Island, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
American Screw Co., Willimantic, Conn.
Anti-Corrosive Metal Products Co., Inc., Castleton-On-Hudson, N. Y.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Continental Screw Co., New Bedford, Mass.
Elco Tool & Screw Corp., Rockford, Ill.
Harper Co., H. M., Morton Grove, Ill.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
National Lock Co., Inc., Rockford, Ill.
Paine Co., Addison, Ill.
Parker-Kalon Div., General American Transportation Corp., Clifton, N. J.
Pheoll Mfg. Co., Chicago, Ill.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Shakeproof Div., Illinois Tool Wks., Elgin, Ill.
Star Stainless Screw Co., Paterson, N. J.

SEALS, SHAFT, MECHANICAL
Anchor Packing Co., Philadelphia, Pa.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., Los Angeles, Calif.
Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Crane Packing Co., Morton Grove, Ill.
Felt Products Mfg. Co., Chicago, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Koppers Company, Inc., Metal Products Div., Baltimore, Md.
Magnetic Seal Corp., Barrington, R. I.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Rotary Seal Div., Muskegon Piston Ring Co., Chicago, Ill.
Schwitzer Corp., Indianapolis, Ind.
Sealol Corp., Providence, R. I.
Syntron Co., Homer City, Pa.
United States Gasket Co., Camden, N. J.
Wolfe Co., Franklin C., Culver City, Calif.

SEALS, TERMINAL, FOR COMPRESSORS
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Minnesota Rubber & Gasket Co., Minneapolis, Minn.
Wolfe Co., Franklin C., Culver City, Calif.

SEAMLESS PIPE
See Pipe, Steel, Seamless

SEPARATORS, AIR
Adams Co., Inc., R. P., Buffalo, N. Y.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Automatic Switch Co., Florham Park, N. J.
Binks Mfg. Co., Chicago, Ill.
Buxton Mfg. Co., Dover, N. J.
Centrifix Corp., Cleveland, O.
Clark Mfg. Co., Cleveland, O.
Combustion Engineering, Inc., New York, N. Y.
Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
Dollinger Corp., Rochester, N. Y.
Dunham-Bush, Inc., West Hartford, Conn.
Gray Co., Inc., Minneapolis, Minn.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Johnson Corp., Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kice Metal Products Co., Wichita, Kans.
Kraissl Co., Inc., The, Hackensack, N. J.
Leavitt Machine Co., Orange, Mass.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Quality Specialty Co., Inc., Camden, N. J.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Burlington, Mass.
Strong, Carlisle & Hammond, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vortox Co., Claremont, Calif.
Watkins Co., J. E., Maywood, Ill.
Watts Regulator Co., Lawrence, Mass.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, BLOWDOWN
Graver Water Conditioning Co., New York, N. Y.
Wilson Engineering Corp., Chicago, Ill.

SEPARATORS, FLANGE
Kraissl Co., Inc., The, Hackensack, N. J.
Williams & Co., J. H., Buffalo, N. Y.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, OIL
Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Air-Maze Corp., Cleveland, O.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and Vapor)
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crane Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Graver Water Conditioning Co., New York, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Heat-X, Inc., Brewster, N. Y.
Hoppes Mfg. Co., Inc., Springfield, O.
Howe Ice Machine Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
King Zeero Co., The, Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
National Valve & Mfg. Co., Pittsburgh, Pa.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Richmond Engineering Co., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond, Cleveland, O.
Techniflex Corp., Port Jervis, N. Y.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Corp., Chicago, Ill.
Warner Lewis Co., Div. of Fram Corp., Tulsa, Okla.
Watkins Co., J. E., Maywood, Ill.
Worthington Corp., East Orange, N. J.
Wright-Austin Co., Detroit, Mich.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

SETS, PIPE BIT, FOR BORING HOLES IN WOOD FOR PIPE AND TUBING
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.

SEWAGE EJECTORS
See Ejectors, Sewage

SEWAGE PUMPS
See Pumps, Sewage

SHAFT SEALS, MECHANICAL
See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL
Albertson & Co., Inc., Sioux City, Ia.
Arens Controls, Inc., Evanston, Ill.
Atmos Corp., Chicago, Ill.
Clark Flexible Link Shaft Co., Newton Highlands, Mass.
Healey Co., Lee, Glendale, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
Piezo Mfg. Corp., Staten Island, N. Y.
Teleflex Incorporated, North Wales, Pa.

SHEARS, ELECTRICAL, PORTABLE
Beverly Shear Mfg. Co., Chicago, Ill.
Black & Decker Mfg. Co., Towson, Md.
M-M-A, Inc., Lancaster, Pa.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Miller Falls Co., Greenfield, Mass.

Skil Corp., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Stanley Works, The, New Britain, Conn.
Thor Power Tool Co., Chicago, Ill.

SHEARS, POWER

Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Bertsch & Co., Inc., Cambridge City, Ind.
Beverly Shear Mfg. Co., Chicago, Ill.
Buckeye Tools Corp., Dayton, O.
Buffalo Forge Co., Buffalo, N. Y. (portable)
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Crane & Eng. Co., Wickliffe, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Diamond Machine Tool Co., Pico, Calif.
Famco Machine Co., Kenosha, Wis.
H-A Mfg. Co., York, Pa.
Hendley & Whittemore, Beloit, Wis.
Kling Bros. Engineering Works, Chicago, Ill. (rotary) (double angle)
Libert Machine Co., Green Bay, Wis.
Mall Tool Co., Div. of Remington Arms Co., Inc., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
St. Louis Tool Co., St. Louis, Mo.
Stamco Inc., New Bremen, Ohio
Whiting Corp., Harvey, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wysong & Miles Inc., Greensboro, N. C.

SHEARS AND SNIPS, HAND

Barlett Mfg. Co., Detroit, Mich.
Basford Co., H. R., San Francisco, Calif.
Beverly Shear Mfg. Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Black & Decker Mfg. Co., Towson, Md. (electrically driven)
Bremil Mfg. Co., Erie, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Clauss Cutlery Co., Fremont, O.
Crescent Tool Co., Jamestown, N. Y.
Diamond Calk Horseshoe Co., Duluth, Minn.
Kidder Mfg. Co., Inc., J. F. Burlington, Vt.
Klenk's Aviation Snips, Wilmington, Del.
Lidseen of North Carolina, Inc., Hayesville, N. C.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Snap-on Tools Corp., Kenosha, Wis.
Thor Tool & Die Co., San Leandro, Calif.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEAVES

See Pulleys and Sheaves, for Belt Drives

SHEET METAL BRAKES

See Brakes, Sheet Metal

SHEET METAL DUCTS

See Ducts and Duct Fittings, Prefabricated Non-Flexible

SHEET METAL FITTINGS

See Ducts and Duct Fittings, Prefabricated Non-Flexible

SHEET METAL PUNCHES

See Punches, Sheet Metal

SHEETS, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Brass & Copper Imports, Inc., Minneapolis, Minn.
Central Steel & Wire Co., Chicago, Ill.
Childers Mfg. Co., Houston, Tex.
Cochran Foil Co., Inc., Louisville, Ky.
Fairmont Aluminum Co., Fairmont, W. Va.
Hunter Mfg. Co., Aluminum Insulation Div., Bristol, Pa. (for pipe covering)
Kaiser Aluminum & Chemical Sales, Inc., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Revere Copper and Brass, Inc., New York.
Reynolds Metals Co., Louisville, Ky.
Rigidized Metals Corp., Buffalo, N. Y.

SHEETS, ALUMINUM COATED

Armco Steel Corp., Middletown, O.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Rigidized Metals Corp., Buffalo, N. Y.
United States Steel Corp., Pittsburgh, Pa.

SHEETS AND BOARD, NON-METALLIC (OTHER THAN PLASTIC), FOR DUCT CONSTRUCTION

Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Met-L-Wood Corp., Chicago, Ill. (plywood composition material faced with sheet metal)
Nicolet Industries, Inc., Hamilton, O.
Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa.
Ruberoid Co., New York, N. Y.
Technical Ply-Wood Sales, Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
Bart Mfg. Corp., Belleville, N. J.
Bridgeport Brass Co., Bridgeport, Conn. (laminates)
Central Steel & Wire Co., Chicago, Ill. (aluminum)
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill. (stainless)
Jessop Steel Co., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Republic Steel Corp., Cleveland, O.
Revere Copper & Brass, Inc., New York.
Rigidized Metals Corp., Buffalo, N. Y.

SHEETS, COPPER

American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Brass & Copper Imports, Inc., Minneapolis, Minn.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Div. of Copper Range Co., Pittsburgh, Pa.
New Haven Copper Co., The, Seymour, Conn.
Olin Mathieson Chemical Corp., Western Brass Mills Div., East Alton, Ill. (Brass, bronze, super X, phosphor bronze)
Revere Copper & Brass, Inc., New York.
Rigidized Metals Corp., Buffalo, N. Y.

SHEETS, LEAD

Alpha Metals, Inc., Jersey City, N. J.
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
Anchor Metal Co., Inc., Brooklyn, N. Y.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Bunker Hill Co., The, Sales & Fabrication Div., Seattle, Wash.
Division Lead Co., Summit, Ill.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Knapp Mills, Inc., Long Island City, N. Y.
National Lead Co., New York, N. Y.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y.
Rigidized Metals Corp., Buffalo, N. Y.
Rochester Lead Wks., Inc., Rochester, N. Y.

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., The, Midland, Mich.
Rigidized Metals Corp., Buffalo, N. Y.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Pittsburgh, Pa.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Cheney Flashing Co., Trenton, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.
Plasteel Products Corp., Washington, Pa.
Rigidized Metals Corp., Buffalo, N. Y.
Robertson Co., H. H., Pittsburgh, Pa.
Technical Ply-Wood Sales, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
Bart Mfg. Corp., Belleville, N. J.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
International Nickel Co., Inc., The, New York, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Olin Mathieson Chemical Corp., Western Brass Mills Div., East Alton, Ill.
Revere Copper and Brass, Inc., New York, N. Y.
Rigidized Metals Corp., Buffalo, N. Y.

SHEETS, PLASTIC, FOR DUCTS AND HOODS

Atlas Mineral Products Co., Mertztown, Pa.
Bakelite Co., Div. of Union Carbide & Carbon Chemical Co., New York, N. Y.
Campco Div., Chicago Molded Products Corp., Chicago, Ill.
Ceilcote, Inc., Cleveland, O.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (Polyvinyl chloride)
Corite Products, Inc., Chicago, Ill.
DuVerre, Inc., Buffalo, N. Y.
Formica Corp., The, Cincinnati, O.
Goodrich Industrial Products Co., B. F., Akron, O. (rigid)
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O. (PVC)
Hartwell & Son, Inc., H. N., Boston, Mass. (PVC)
Haveg Industries, Inc., Newark, Del.
Heil Process Equipment Corp., Cleveland, O.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Kaykor Industries, Inc., Yardville, N. J.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Resolite Corp., Zelienople, Pa.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Seelye Craftsmen, The, Minneapolis, Minn.
Seiberling Rubber Co., Plastics Div., Newcomerstown, O.
Southern Plastics Co., Columbia, S. C.
United States Rubber Co., New York, N. Y.

SHEETS, STEEL, COPPER BEARING

Acme Newport Steel Co., Newport, Ky.
Alan Wood Steel Co., Conshohocken, Pa.
Armco Steel Corp., Middletown, O.
Berger Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel & Wire Co., Chicago, Ill.
Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Great Western Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Rigidized Metals Corp., Buffalo, N. Y.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala.
United States Steel Corp., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, GALVANIZED

Armco Steel Corp., Middletown, O.
Berger Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel & Wire Co., Chicago, Ill.
Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Great Western Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Rigidized Metals Corp., Buffalo, N. Y.
Ryerson & Son. Inc., Joseph T., Chicago, Ill.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala.
United States Steel Corp., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

SHEETS, STEEL, GALVANNEALED

American Agile Corp., Bedford, O. (sheets plastic)
Berger Div., Republic Steel Corp., Canton, O.
Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
Great Western Steel Co., Chicago, Ill.
Republic Steel Corp., Cleveland, O.
Rigidized Metals Corp., Buffalo, N. Y.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sharon Steel Corp., Sharon, Pa.
United States Steel Corp., Pittsburgh, Pa.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
Armco Steel Corp., Middletown, O.
Berger Div., Republic Steel Corp., Canton, O.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Eastern Stainless Steel Corp., Baltimore, Md.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Jones & Laughlin Steel Corp., Stainless Steel Div., Detroit, Mich.
Republic Steel Corp., Cleveland, O.
Rigidized Metals Corp., Buffalo, N. Y.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala.
United States Steel Corp., Pittsburgh, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Div., Ball Brothers Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Summit, Ill.
Illinois Zinc Co., Div. of Hydrometals, Inc., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Rigidized Metals Corp., Buffalo, N. Y.

SHIELDS, CORROSION, FOR PIPE JOINTS

Atlas Mineral Products Co., Mertztown, Pa.

SHIELDS, VALVE BONNET

Industrial Products Co., Philadelphia, Pa.
Wilmington Plastics Co., Wilmington, Del.

SHOCK ABSORBERS, LIQUID

See Absorbers, Shock, Liquid

SHUTTERS

See Louvers and Shutters

SIGHT GLASSES

See Glasses, Sight, for Pipe Lines

SIGNALS, LIQUID LEVEL

See Alarms, Liquid Level

SIGNALS, TANK FILL

See Alarms, Liquid Level

SILENCERS, DUCT

See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems

SILENCERS FOR REDUCING COMPRESSOR INTAKE NOISE

Air-Maze Corp., Cleveland, O.
Dollinger Corp., Rochester, N. Y.

SIPHONS, STEAM GAGE

Crane Co., Chicago, Ill.
Pittsburgh Nipple Works, Pittsburgh, Pa.

SLEEVE BEARINGS

See Bearings, Sleeve

SLEEVES, PIPE REPAIR

See Clamps, Pipe Repair

SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

SMOKE ALARMS

See Alarms, Smoke

SMOKE ELIMINATORS

See Jets, Overfire Air, for Smoke Abatement

SMOKE GUNS

See Guns, Pots and Candles, Smoke and Smudge

SMOKE INDICATORS

See Indicators, Smoke

SMUDGE POTS

See Guns, Pots and Candles, Smoke and Smudge

SNOW MELTING ANTI-FREEZE

See Compounds, Anti-Freeze

SOFTENERS, WATER

American Water Softener Co., Philadelphia.
American Well Works, Aurora, Ill.
Anderson-Stolz Corp., Kansas City., Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Belco Industrial Equipment Div., Bogue Electric Mfg. Co., Paterson, N. J.
Bruner Corp., Milwaukee, Wis.
Clayton Mfg. Co., El Monte, Calif.
Cochrane Corp., Philadelphia, Pa.
Culligan, Inc., Norbrook, Ill.
Dearborn Chemical Co., Chicago, Ill.
Duro Co., Dayton, O.
Elgin Softener Corp., Elgin, Ill.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York.
Hungerford & Terry, Inc., Clayton, N. J.
Illinois Water Treatment Co., Rockford, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Modern Div., George Getz Corp., Rockford, Ill.
Myers & Bro. Co., F. E., The, Ashland, O.
Norwood Associated Engineers Inc., Springfield, Mass.
Oakite Products, Inc., New York, N. Y.
Oshkosh Filter & Softener Co., Oshkosh, Wis.
Permutit Co., New York, N. Y.
Radiant Utilities Corp., Brooklyn, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Reynolds Water Conditioning Co., Detroit, Mich.
Sherwood Water Treatment Co., Inc., Beverly, N. J.
Smith Chemical Co., E. W., La Puente, Calif.
Stover Water Softener Co., St. Charles, Ill.
Uniflow Mfg. Co., Erie, Pa.

SOLAR HEAT REFLECTORS

See Canopies, Metal, Sun, Reflecting

SOLAR HEAT RESISTING LOUVERS AND SCREENS

See Louvers, Sun Reflecting; and Screens, Sun Reflecting

SOLAR SENSING INSTRUMENTS FOR HEATING AND AIR CONDITIONING

See Instruments, Solar Sensing, for Heating and Air Conditioning

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

Air Reduction Co., Inc., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allen Co., Inc., L. B., Schiller Park, Ill.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alpha Metals, Inc., Jersey City, N. J.
American Platinum Works, Newark, N. J.
Anchor Metal Co., Inc., Brooklyn, N. Y.
Baker & Co., Inc., Newark, N. J.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Eutectic Welding Alloys Corp., Flushing, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.
Hi-Grade Alloy Corp., Chicago, Ill.
Industrial Service Laboratories, Milwaukee.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Lake Chemical Co., Chicago, Ill.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif.
Mueller Brass Co., Port Huron, Mich.
National Cylinder Gas Co., Chicago, Ill.
Oxygen Equipment & Service Co., Chicago.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., Ossining, N. Y.
Stainless Processing Div., Wall Colmonoy Corp., Detroit, Mich.
United Wire & Supply Corp., Cranston, R. I.
Wabash Corp., Chicago, Ill.
Weldit, Inc., Detroit, Mich.

SOLDER (TIN-LEAD), AND FLUXES

Accurate Specialties Co., Inc., Long Island City, N. Y.
Allen Co., Inc., L. B., Schiller Park, Ill.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Alpha Metals, Inc., Jersey City, N. J.
American Sanitary Mfg. Co., Abingdon, Ill.
American Smelting & Refining Co., Federated Metals Div., New York, N. Y.
American Solder & Flux Co., Philadelphia, Pa.
Anchor Metal Co., Inc., Brooklyn, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., New Hartford, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Bunker Hill Co., The, Sales & Fabrication Div., Seattle, Wash.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Summit, Ill.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington, Del.
Eutectic Welding Alloys Corp., Flushing, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Fluxolder Products Co., Detroit, Mich., (solder paints)
Gardiner Metal Co., Chicago, Ill.
Helmco, Inc., Chicago, Ill.
Hercules Chemical Co., Inc., New York, N. Y.
Hi-Grade Alloy Corp., Chicago, Ill.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnson Foil Mfg. Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lake Chemical Co., Chicago, Ill. (fluxes in paste, stik & liquid form)

Lenk Mfg. Co., Franklin, Ky.
London Chemical Co., Melrose Park, Ill.
Mill-Rose Co., Cleveland, O.
Mueller Brass Co., Port Huron, Mich.
National Lead Co., New York, N. Y.
Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Potts-Farrington Co., Philadelphia, Pa.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., Brooklyn, N. Y.
Rochester Lead Works, Inc., Rochester, N. Y.
Rotometals, San Francisco, Calif.
Ruby Chemical Co., Columbus, O.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., Ossining, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
Automatic Switch Co., Florham Park, N. J.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dole Valve Co., The, Morton Grove, Ill.
Dormeyer Industries, Chicago, Ill.
Essex Wire Corp., Ft. Wayne, Ind.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hubbell Corp., Mundelein, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Monitor Controller, Rockland, Mass.
National Acme Co., The, Cleveland, O.
Sporlan Valve Co., St. Louis, Mo.
Struthers-Dunn, Inc., Pitman, N. J.
Synchro-Start Products, Inc., Skokie, Ill.
Trombetta Solenoid Corp., Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.

SOLENOID VALVES

See Valves, Solenoid

SOLVENT, PENETRANT, FOR LOOSENING THREADED JOINTS

Cabot & Sons Co., Samuel, Boston, Mass.
Hercules Chemical Co., Inc., New York, N. Y.
Krylon, Inc., Norristown, Pa.
National Pipe Coatings, Inc., Huntington Park, Calif.
Permatex Co., Inc., Brooklyn, N. Y.
Petroleum Solvents Corp., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Sealed Unit Parts Co., Inc., Bronx, N. Y.

SOOT BLOWERS

See Blowers, Soot

SOOT DESTROYERS

See Destroyers, Soot, Chemical

SOUND ABSORBERS

See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems

SOUND ATTENUATOR BOXES

See Units, Mixing, Sound and Volume Control, for Double Duct High Velocity Air Conditioning Systems

SOUND CONTROL FOR COOLING TOWERS

See Noise Elimination for Cooling Towers

SOUND DEADENING FOR DUCTS

See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems; Insulation, Duct, Sound Deadening

SOUND INDICATORS

See Indicators, Sound Level

SOUND TESTERS FOR LOCATING MECHANICAL TROUBLES

See Testers, Sound

SOUND TRAPS

See Absorbers, Sound, Prefabricated Duct Section, for Noise Control in Duct Systems

SPARGER NOZZLES

See Nozzles, Sparger, for Tank Heating

SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical

SPEED REDUCERS

See Reducers, Speed

SPIRAL PIPE

See Pipe, Spiral Welded

SPIRAL PIPE FOR HIGH VELOCITY AIR SYSTEMS

See Ducts, Spiral Welded

SPOT WELDERS

See Welders, Spot

SPRAY HUMIDIFIERS

See Humidifiers, Direct, Spray Head

SPRAY NOZZLES

See Nozzles, Spray

SPRAY PAINTING BOOTHS

See Booths, Painting, Spray

SPRINKLER HEADS

See Heads, Sprinkler

SPRINKLER SYSTEM CONTROLS

See Controls, Fire Protection Sprinkler System; Valves, Fire Protection Sprinkler System Control

SPRINKLERS FOR FIRE PROTECTION

See Heads, Sprinkler

STACKS AND CHIMNEYS, INDUSTRIAL, PREFABRICATED

Acme Welding, Div. of the United Tool & Die Co., West Hartford, Conn.
American Pipe & Steel Corp., Alhambra, Calif.
Bigelow Co., The, New Haven, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.
Condensation Engineering Corp., Chicago, Ill.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Finnigan & Co., Inc., J. J., Atlanta, Ga.
Hodge Boiler Wks., East Boston, Mass.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Kellogg Co., M. W., The, New York, N. Y.
Kirk & Blum Mfg. Co., Cincinnati, O.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lucey Boiler & Mfg. Corp., Chattanooga, Tenn.
McQuay, Inc., Minneapolis, Minn.
Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Shutt Process Equipment Corp., St. Louis, Mo.
Smith Corp., A. O., Milwaukee, Wis.
Van-Packer Co., Div. of the Flintkote Co., Bettendorf, Ia.

STAINLESS STEEL PIPE

See Pipe, Steel, Stainless

STAINLESS STEEL SHEETS

See Sheets, Steel, Stainless

STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Capewell Mfg. Co., Hartford, Conn.
Erie Tool Wks., Erie, Pa.
International Forge Co., Chicago, Ill.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Talon Tools, Inc., North Arlington, N. J.
Toledo Pipe Threading Machine Co., Toledo, O.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y

STANDS, TANK

Acme Steel Co., Chicago, Ill. (slotted angle)
Acme Welding, Div. of the United Tool & Die Co., West Hartford, Conn.
American Pipe & Steel Corp., Alhambra, Calif.
Basic Engineers, Inc., Sharpsburg, Pa.
California Steel Products, Div. of Yuba Consolidated Industries, Inc., Richmond, Calif.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.

STAPLES FOR FASTENING TUBING

See Hangers and Supports, Pipe

STARTERS, MOTOR

See Controllers and Starters, Motor

STEAM BOOSTER COMPRESSORS

See Compressors, Steam Booster

STEAM ENGINES

See Engines, Steam

STEAM GENERATORS

See Boilers

STEAM JET HEATERS

See Heaters, Steam Jet, for Liquids

STEAM JET REFRIGERATION

See Compressors, Refrigerating, Steam Jet

STEAM PRESSURE REGULATORS

See Valves, Pressure Reducing and Regulating

STEAM PUMPS

See Pumps, Steam

STEAM SEPARATORS

See Separators, Steam and Oil

STEAM TRAPS

See Traps, Steam

STEEL PIPE

See Pipe, Steel

STEEL TUBE FITTINGS, FLARED

See Fittings, Steel Tube, Flared

STEEL TUBING

See Tubing, Steel

STEEL UNIONS

See Unions, Steel

STEEL VALVES

See Valves, Gate; and Valves, Globe

STERILIZING LAMPS

See Lamps, Sterlizing, for Duct Installation

STERILIZING UNITS

See Units, Sterilizing, Air

STOCKS AND DIES

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Erie Tool Wks., Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., Erie, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.

Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Thor Tool & Die Co., San Leandro, Calif.
Threadwell Tap & Die Co., Greenfield, Mass.
Toledo Pipe Threading Machine Co., Toledo, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 to 1200 Lb per Hr

Allington & Curtis Mfg. Co., Saginaw, Mich. (For shavings, chips and sawdust)
American Coal Burner and Wood Stoker Corp., Chicago, Ill. (solid fuels combination system)
American Engineering Co., Philadelphia, Pa. (underfeed, spreader)
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Foundry, Inc., Heating Div., Auburn, Ind.
Automatic Corp., St. Louis, Mo.
Automatic Solid Fuels Equipment Co., Indianapolis, Ind.
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Carpenter Heating & Air Conditioning Co., Cleveland, O.
Combustion Engineering, Inc., New York, N. Y.
Dayton Automatic Stoker Co., Dayton, O.
Detroit Stoker Co., Monroe, Mich. (3000 lb coal per hr to 400,000 lb steam per hr)
Electric Furnace-Man, Inc., Emmaus, Pa. (wet grate)
Erie City Iron Works, Erie, Pa.
Flynn & Emrich Co., Baltimore, Md.
Frederick Iron & Steel Inc., Frederick, Md.
Freeman Heating Div., Illinois Iron & Bolt Co., Carpentersville, Ill.
Gross-Aire Mfg. Co., Overland, Mo.
Heating Assurance, Inc., Spokane, Wash.
Hershey Motorstoker, Inc., Manheim, Pa. (anthracite)
Hoffman Combustion Engrg. Co., Lincoln Park, Mich. (spreader type; 10,000 to 500,000 lb. per hr)
Iron Fireman Mfg. Co., Cleveland, O. (underfeed)
Johnston & Jennings Co., Cleveland, O. (chain grate)
Kol-Master Corp., Oregon, Ill.
Laclede Stoker Co., St. Louis, Mo. (chain grate, spreader) (over 1200 lb per hr)
Leffel & Co., James, Springfield, O.
Mallory Sales Co., Dolton, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Ormsby-Osterman, Inc., St. Louis, Mo.
Riley Stoker Corp., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Sun-Fire Stoker Corp., New Albany, Ind. (Hopper and bin feed)
V. & E. Products, Inc., Schuylkill Haven, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiting Fire Power Products Corp., Superior, Wis.
Whitty Co., Inc., Boston, Mass. (Bituminous)
Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Airaterra (Roylyn Products), Glendale, Calif.
Air-Maze Corp., Cleveland, O.
Alco Valve Co., St. Louis, Mo.
Andale Co., Philadelphia, Pa.
Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Armstrong Machine Wks., Three Rivers, Mich.
Automatic Switch Co., Florham Park, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Newtonville, Mass. (steam and water only)
Barrett Haentjens & Co., Hazelton, Pa.
Blackmer Pump Co., Grand Rapids, Mich.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Clayton Mark & Co., Evanston, Ill.
Coen Co., San Francisco, Calif.
Cooper Alloy Corp., Hillside, N. J.
Corning Glass Works, Corning, N. Y.
Crane Co., Chicago, Ill.
Cuno Engineering Corp., Meriden, Conn.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
DeZurik Corp., Sartell, Minn.
Eddington Metal Specialty Co., Eddington, Pa.
Edward Valves, Inc., East Chicago, Ind.
Elliott Co., Jeannette, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
General Ceramics Corp., Keasbey, N. J. (ceramic)
General Controls Co., Glendale, Calif. and Skokie, Ill.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Granberg Corp., Oakland, Calif.
Hauck Mfg. Co., Brooklyn, N. Y.
Hays Mfg. Co., Erie, Pa.
Henry Valve Co., Melrose Park, Ill.
Hetherington & Berner, Inc., Indianapolis, Ind. (jacketed)
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kaye & McDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Kinney Mfg. Div., The New York Air Brake Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leslie Co., Lyndhurst, N. J.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Morrison Brothers Co., Dubuque, Ia.
Mueller Co., Decatur, Ill.
Mueller Brass Co., Port Huron, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
OPW Corp., Cincinnati, O.
Perfecting Service Co., Charlotte, N. C.
Phillips & Co., H. A., Chicago, Ill.
Pittsfield Products, Inc., Ann Arbor, Mich. (wire cloth)
Preferred Utilities Mfg. Corp., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Self Cleaning Strainer Co., Oak Lawn, Ill.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Burlington, Mass.
Spraying Systems Co., Bellwood, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Staples & Pfeiffer, San Francisco, Calif.
Steinen Mfg. Co., Wm., Newark, N. J.
Sterling, Inc., Milwaukee, Wis.
Strong, Carlisle & Hammond, Cleveland, O.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc. Westfield, Mass.
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.
Warren Engineering Co., Broadway, N. J.
Water Cooling Corp., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.
Winslow Engineering & Mfg. Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.
Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

STRAINERS, REFRIGERANT, LIQUID LINE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
General Controls Co., Glendale, Calif.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kenmore Machine Products, Inc., Lyons, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Madden Brass Products Co., Aurora, Ill.
McIntire Co., The, Livingston, N. J.
Mueller Brass Co., Port Huron, Mich.
Newark Wire Cloth Co., Newark, N. J.
Pittsfield Products, Inc., Ann Arbor, Mich. (wire cloth)
Refrigerating Specialties Co., Chicago, Ill.
Refrigeration Research, Inc., Brighton, Mich.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Self Cleaning Strainer Co., Oak Lawn, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Velan Valve Corp., Plattsburgh, N. Y.
Wabash Corp., Chicago, Ill.

STRAINERS, SUCTION, FOR AIR WASHERS

Bahnson Co., Winston-Salem, N. C.
Eddington Metal Specialty Co., Eddington, Pa.
Keckley Co., O. C., Skokie, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Milwaukee Valve Co., Milwaukee, Wis.
Newark Wire Cloth Co., Newark, N. J.
Staples & Pfeiffer, San Francisco, Calif.
Water Cooling Corp., New York, N. Y.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD DRIVERS

See Fasteners, Powder Operated

STUD WELDERS

See Welders, Stud

SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

See Pumps, Sump

SUPERHEATERS, PROCESS STEAM

Alstrom Corp., New York, N. Y.
Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Electro-Therm, Inc., Silver Spring, Md.
Foster Wheeler Corp., New York, N. Y.
Murray Iron Wks. Co., Burlington, Ia.

Springfield Boiler Co., Springfield, Ill.
Tranter Mfg. Inc., Lansing, Mich.
Union Iron Works, Erie, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

SURFACE, FINNED, COOLING, BRINE

Aerofin Corp., Syracuse, N. Y.
Alco Products, Inc., Schenectady, N. Y.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Blazer & Son, M., Passaic, N. J.
Drayer-Hanson, Div. of National U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, Massillon, O.
Heat-Exchangers, Inc., Chicago, Ill.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Imeco, Inc., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Union, N. J.
Trane Co., The, LaCrosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Wolverine Tube, Div. of Calumet and Hecla, Inc., Allen Park, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, COLD WATER

Aerofin Corp., Syracuse, N. Y.
Alco Products, Inc., Schenectady, N. Y.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Blazer & Son, M., Passaic, N. J.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, Massillon, O.
Halstead & Mitchell, Pittsburgh, Pa.
Hastings Air Control, Inc., Omaha, Nebr.
Heat-Exchangers, Inc., Chicago, Ill.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Imeco, Inc., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Magic Aire Div., United Electric Co., Wichita Falls, Tex.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National-U.S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Union, N. J.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, LaCrosse, Wis.
Tubenfin Coil Co., Houston, Tex.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Witt Co., A. H., Los Angeles, Calif.
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

Aerofin Corp., Syracuse, N. Y.
Alco Products, Inc., Schenectady, N. Y.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Baker Mfg. Co., Wichita Falls, Tex.
Bayley Blower Co., Milwaukee, Wis.
Blazer & Son, M., Passaic, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Bohn Aluminum & Brass Corp., Betz Div., Danville, Ill.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, Massillon, O.
Halstead & Mitchell, Pittsburgh, Pa.
Hastings Air Control, Inc., Omaha, Nebr.
Heat-Exchangers, Inc., Chicago, Ill.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Imeco, Inc., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Kirsch Co., Refrigeration Div., Sturgis, Mich.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Magic Aire Div., United Electric Co., Wichita Falls, Tex.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Union, N. J.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, LaCrosse, Wis.
Tranter Mfg. Inc., Lansing, Mich.
Tubenfin Coil Co., Houston, Tex.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Witt Co., A. H., Los Angeles, Calif.
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, ELECTRIC HEATING ELEMENT

Blazer & Son, M., Passaic, N. J.
Marlo Coil Co., St. Louis, Mo.
Roberson, Inc., Seattle, Wash.
Wiegand Co., E. L., Pittsburgh, Pa.

SURFACE, FINNED, HEATING AND COOLING, PRE-ASSEMBLED, INCLUDING COILS, ELIMINATOR PLATES, SETTLING TANK, AND CASING

Blazer & Son, M., Passaic, N. J.
Clarage Fan Co., Kalamazoo, Mich.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
National-U.S. Radiator Corp., Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
Embassy Steel Products, Inc., Brooklyn, N. Y.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Griscom-Russell Co., The, Massillon, O.
Imeco, Inc., Chicago, Ill.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
Modine Mfg. Co., Racine, Wis.
Moore Dry Kiln Co., Jacksonville, Fla.
Murray Mfg. Co., D. J., Wausau, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
New York Blower Co., Chicago, Ill.
Recold Corp., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spi-Rol-Fin Corp., Pequannock, N. J.
Tenney Engineering, Inc., Union, N. J.
Trane Co., The, LaCrosse, Wis.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Blazer & Son, M., Passaic, N. J.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
Embassy Steel Products, Inc., Brooklyn, N. Y.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, Massillon, O.
Halstead & Mitchell, Pittsburgh, Pa.
Hastings Air Control, Inc., Omaha, Neb.
Heat-Exchangers, Inc., Chicago, Ill.
Heat-X, Inc., Brewster, N. Y.
Hoff Mfg. Co., Bethany, New Haven, Conn.
Imeco, Inc., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lewis & Saunders, Lakeport, N. H.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.

Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spi-Rol-Fin Corp., Pequannock, N. J.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Union, N. J.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, LaCrosse, Wis.
Tubenfin Coil Co., Houston, Tex.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Witt Co., A. H., Los Angeles, Calif.
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SUSPENDED FURNACES

See Heaters, Air

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

Adam Electric Co., Frank, St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Switch Co., Florham Park, N. J.
Barber-Colman Co., Rockford, Ill.
Burke Engineering, Los Angeles, Calif.
Circuit Protective Devices Dept., General Electric Co., Plainville, Conn.
Clark Controller Co., Cleveland, O.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
Ebert Electronics Corp., Queens Village, N. Y.
Electric Controller & Mfg. Co., Div. of Square D Co., Cleveland, O.
Essex Wire Corp., Ft. Wayne, Ind.
Ferro Electric Products, Inc., Kirkland, Ill.
Furnas Electric Co., Batavia, Ill.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Electric Co., Appliance Control Dept., Morrison, Ill.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Goodwill Mfg. Co., Chicago, Ill.
Guardian Electric Mfg. Co., Chicago, Ill.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hart Mfg. Co., Hartford, Conn.
Haydon Co., A. W., Waterbury, Conn.
Heinemann Electric Co., Trenton, N. J.
Kulka Electric Mfg. Co., Inc., Mt. Vernon, N. Y.
Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Mallory & Co., Inc., P. R., Indianapolis, Ind.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Micro Switch Div. of Minneapolis-Honeywell **Regulator Co., Freeport, Ill.**
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller, Rockland, Mass.
Morse-Smith-Morse, Inc., Watertown, Mass.
National Acme Co., The, Cleveland, O.
Parish Co., New Orleans, La.
Penn Controls, Inc., Goshen, Ind.
Pyle-National Co., The, Chicago, Ill.
Reynolds Electric Co., River Grove, Ill.
Scaico Controls Inc., Delanco, N. J.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass. (precision)
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Pitman, N. J.
Unimax Switch Div., W. L. Maxson Corp., Wallingford, Conn.
United Electric Controls Co., Watertown, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wind-Way Fan & Ventilator Co., New Orleans, La. (fire fuse)
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Frick Co., Waynesboro, Pa.
Magnetrol, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.

SWITCHES, FLOW

Barton Instrument Corp., Los Angeles, Calif.
Cook Electric Co., Chicago, Ill.
Dietz Co., Henry G., Long Island City, N. Y.
Drying Systems Co., Chicago, Ill. (air)
Fischer & Porter Co., Hatboro, Pa.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Hays Mfg. Co., Erie, Pa.
Magnetrol Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.

SWITCHES, LIQUID LEVEL

Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Control Co., St. Paul, Minn.
Barton Instrument Corp., Los Angeles, Calif.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Clark Controller Co., Cleveland, O.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Cook Electric Co., Chicago, Ill.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
Detroit Controls Corp., Detroit, Mich.
Dietz Co., Henry G., Long Island City, N. Y.
Fischer & Porter Co., Hatboro, Pa.
Furnas Electric Co., Batavia, Ill.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hays Mfg. Co., Erie, Pa.
Healy Ruff Co., St. Paul, Minn.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Kenco Pump Div., American Crucible Products Co., Lorain, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Penn Controls, Inc., Goshen, Ind.
Petrometer Corp., Long Island City, N. Y.
Ripley Co., Inc., Middletown, Conn.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Techniflex Corp., Port Jervis, N. Y.
Trimount Instrument Co., Chicago, Ill.
United Electric Controls Co., Watertown, Mass.
Westinghouse Electric Corp., **Pittsburgh, Pa.**

SWITCHES, MERCURY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Ebert Electronics Corp., Queens Village, N. Y.
G. M. Mfg. Co., New York, N. Y.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Mercoid Corp., Chicago, Ill.
Micro Switch Div. of Minneapolis-Honeywell **Reg. Co., Freeport, Ill.**
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, PNEUMATIC

Allen-Bradley Co., Milwaukee, Wis.
Automatic Control Co., St. Paul, Minn.
Bristol Co., The, Waterbury, Conn.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Cook Electric Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
Magnetrol, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.

SWITCHES, PRESSURE AND VACUUM

Allen-Bradley Co., Milwaukee, Wis.
Au-Temp-Co Corp., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Barksdale Valves, Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Cleveland Controls, Inc., Cleveland, O.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., Boody, Ill.
Detroit Controls Corp., Detroit, Mich.
Dietz Co., Henry G., Long Island City, N. Y.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Furnas Electric Co., Batavia, Ill.
General Controls Corp., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Healy Ruff Co., St. Paul, Minn.
Leach Relay Co., Los Angeles, Calif.
Longergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Nason Co., Clarkston, Mich.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Shallcross Controls, Inc., Markesan, Wis.
Square D Co., Industrial Controller Div., Milwaukee, Wis.

Synchro-Start Products, Inc., Skokie, Ill.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Co., St. Louis, Mo.

SWITCHES, TIME

Aemco Inc., Mankato, Minn.
A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J.
Allen-Bradley Co., Milwaukee, Wis.
April Showers Co., Inc., Washington, D. C.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Burke Engineering, Los Angeles, Calif.
Cissell Mfg. Co., W. M., Louisville, Ky.
Clock & Timer Dept., General Electric Co., Ashland, Mass.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Cramer Controls Corp., Centerbrook, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.
Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., West Orange, N. J.
General Controls Corp., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
Haydon Co., A. W., Waterbury, Conn.
Haydon Mfg. Co., Inc., Sub. General Time Corp., Torrington, Conn.
Heat-Timer Corp., New York, N. Y.
International Register Co., Chicago, Ill.
Mallory & Co., Inc., P. R., Indianapolis, Ind.
Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Time & Signal Corp., Detroit, Mich.
Paragon Electric Co., Two Rivers, Wis.
Partlow Corp., The, New Hartford, N. Y.
Reliance Automatic Lighting Co., Racine, Wis.
Rhodes, Inc., M. H., Hartford, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Sangamo Electric Co., Springfield, Ill.
Tork Time Controls, Inc., Mount Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWIVEL PIPE COUPLINGS

See Joints, Pipe, Flexible Swing and Revolving

SYSTEMS, COMBUSTION CONTROL

Ace Instrument Co., Inc., Brooklyn, N. Y.
Askania Regulator Co., Chicago, Ill.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bressler Engineering Service, Oregon, Ill.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cash Co., A. W., Decatur, Ill.
Cleveland Controls, Inc., Cleveland, O.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Defender Instrument & Regulator Co., Boody, Ill.
De-Tec-Tronic Corp., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Fischer & Porter Co., Hatboro, Pa.
Foster Wheeler Corp., New York, N. Y.
General Controls Co., Glendale, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Heat-Timer Corp., New York, N. Y.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Leahy Mfg. Co., Los Angeles, Calif.
Leeds & Northrup Co., Philadelphia, Pa.
Lientz Co., B. P., Kansas City, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Roth Co., Roy E., Rock Island, Ill.
Shallcross Controls, Inc., Markesan, Wis.
Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Stout & Sons, David, St. Louis, Mo.
Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

SYSTEMS, CONDENSATE RETURN

Acker Corp., Meridian, Miss.
Advance Pump Co., Berkeley, Calif.
Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Barnes & Jones, Inc., Newtonville, Mass.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky
Decatur Pump Co., Decatur, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Patterson-Kelley Co., Inc., The, E. Stroudsburg, Pa.
Sarco Co., Inc., New York, N. Y.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Stout & Sons, David, St. Louis, Mo.
Weil Pump Co., Chicago, Ill.
York-Shipley, Inc., York, Pa.

SYSTEMS, ELECTRIC PIPE HEATING

Fluid Systems, Inc., New Haven, Conn.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Trent, Inc., Philadelphia, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

SYSTEMS, FIRE EXTINGUISHING, AND HEAT AND SMOKE DETECTORS

Allen Mfg. Co., W. D., Chicago, Ill.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Blaw Knox Co., Power Piping & Sprinkler Div., Pittsburgh, Pa.
C-O-Two Fire Equipment Co., Newark, N. J.
Cardox Corp., Chicago, Ill.
Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., West Orange, N. J.
Grinnell Co., Inc., Providence, R. I.
Heat-Timer Corp., New York, N. Y.
Hodgman Mfg. Co., Inc., Taunton, Mass.
Mearlcrete Div., Mearl Mfg. Corp., Roselle Park, N. J.
Miller-Harris Instrument Co., Milwaukee, Wis.
Photobell Co., Inc., New York, N. Y.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Sperti Faraday, Inc., Adrian, Mich.
Worner Electronic Devices, Rankin, Ill.

SYSTEMS, HEATING, HIGH TEMPERATURE HOT WATER

Over 350 *F*

American Hydrotherm Corp., Long Island City, N. Y.
Barber-Colman Co., Rockford, Ill.
Buxton Mfg. Co., Dover, N. J.
Combustion Engineering Inc., New York, N. Y.
International Boiler Works, The, East Stroudsburg, Pa.
Kaiser Co., E. B., Glenview, Ill.
Midland-Ross Corp., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Taco Heaters, Inc., Cranston, R. I.

SYSTEMS, HEATING, HOT WATER

Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kehm Corp., The, Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A. Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Webster & Co., Warren, Camden, N. J.
Weil-McLain Co., Michigan City, Ind.

SYSTEMS, HEATING, VACUUM

Barnes & Jones, Inc., Newtonville, Mass.
Dunham-Bush, Inc., West Hartford, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VAPOR

Barnes & Jones, Inc., Newtonville, Mass.
Dunham-Bush, Inc., West Hartford, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Armstrong Machine Wks., Three Rivers, Mich.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Newtonville, Mass.
Bell & Gossett Co., Morton Grove, Ill.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Dunham-Bush, Inc., West Hartford, Conn.
Heat-Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
SelecTemp Div., Iron Fireman Mfg. Co., Cleveland, O.
Thrush & Co., H. A., Peru, Ind.
Webster & Co., Warren, Camden, N. J.
Weil-McLain Co., Michigan City, Ind.
Zone-Heat Regulator Co., Garrettsville, O.

SYSTEMS, HOT GAS DEFROSTING, FOR REFRIGERATION

Blazer & Son, M., Passaic, N. J.
Dole Refrigerating Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.

McQuay, Inc., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Recold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Union, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

American Hydrotherm Corp., Long Island City, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Beltran Associates, Inc., Brooklyn, N. Y.
Buxton Mfg. Co., Dover, N. J.
Dow Chemical Co., The, Midland, Mich.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Foster Wheeler Corp., New York, N. Y.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
International Boiler Works, The, East Stroudsburg, Pa.
Kaiser Co., E. B., Glenview, Ill.
Midland-Ross Corp., New York, N. Y.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Peabody Engineering Corp., New York, N. Y.
Reznor Mfg. Co., Mercer, Pa.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Sarcotherm Controls, Inc., New York, N. Y.
Struthers Wells Corp., Warren, Pa.
Trent, Inc., Philadelphia, Pa.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

April Showers Co, Inc., Washington, D. C.
Binks Mfg. Co., Chicago, Ill.
Muellermist Irrigation Co., Maywood, Ill.
Ruppright's Rotary Roof Cooler, Los Angeles, Calif.
Spray Engineering Co., Burlington, Mass.
Spraying Systems Co., Bellwood, Ill.
Water Cooling Corp., New York, N. Y.

TABLES, BENDING, PIPE

American Pipe Bending Machine Co., Inc., Poultney, Vt.

TAGS, VALVE, FOR IDENTIFYING VALVES

Burke Engineering Co., Los Angeles, Calif.
Chase Brass & Copper Co., Waterbury, Conn.
Meyer & Wenthe, Inc., Chicago, Ill.
Seton Name Plate Co., New Haven, Conn.

TANK FITTINGS

See Fittings and Bushings, Fuel Oil Tank; Alarms, Liquid Level

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANK LININGS

See Coatings, Protective, for Metals

TANKS, BLOWOFF

Acme Welding, Div. of the United Tool & Die Co., West Hartford, Conn.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
American Pipe & Steel Corp., Alhambra, Calif.
American Water Softener Co., Philadelphia, Pa.
Bigelow Co., The, New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg Co., Wm., Minneapolis, Minn.
Buffalo Tank Corp., Dunellen, N. J.
Chicago Steel Tank Co., Div. of U. S. Industries, Inc., Chicago, Ill.
Crotty Mfg. Corp., Flushing, Long Island, N. Y.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Ellicott Fabricators, Inc., Baltimore, Md.
Finnigan & Co., Inc., J. J., Atlanta, Ga.
Gabriel Boiler Co., Portland, Ore.
Graver Water Conditioning Co., New York, N. Y.
Hodge Boiler Wks., East Boston, Mass.
Hoppes Mfg. Co., Inc., Springfield, O.
International Boiler Works Co., The, East Stroudsburg, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lucey Boiler & Mfg. Corp., Chattanooga, Ill.
Manitowoc Shipbuilding, Inc, Manitowoc, Wis.
Morrison Brothers Co., Dubuque, Ia.
Murray Iron Wks. Co., Burlington, Ia.
Nooter Corp., St. Louis, Mo.
Norse Boiler Co., Inc, New Market, N. J.
Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Richmond Engineering Co., Richmond, Va.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Union Iron Works, Erie, Pa.

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

Acme Welding, Div. of the United Tool & Die Co., West Hartford, Conn.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Chicago Steel Tank Co., Div. of U. S. Industries, Inc., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Ellicott Fabricators, Inc., Baltimore, Md.
Finnigan & Co., Inc., J. J., Atlanta, Ga.
Gabriel Boiler Co., Portland, Ore.
General Automatic Products Corp., Baltimore, Md.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
International Boiler Works Co., The, East Stroudsburg, Pa.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Morrison Brothers Co., Dubuque, Ia.
Norse Boiler Co., Inc., New Market, N. J.
Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Rheem Mfg. Co., Chicago, Ill.
Richmond Engineering Co., Richmond, Va.
Scaife Co., Oakmont, Pa.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Wood Co., John, Conshohocken, Pa.

TANKS, PROCESS AND STORAGE

Acme Welding, Div. of the United Tool & Die Co., West Hartford, Conn.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alco Products, Inc., Schenectady, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Rubber lined)
American Pipe & Steel Corp., Alhambra, Calif.
Atlas Mineral Products Co., Mertztown, Pa.
Beaird Co., J. B., Shreveport, La.
Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Binks Mfg. Co., Chicago, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
California Steel Products, Div. of Yuba Consolidated Industries, Inc., Richmond, Calif.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Metal Mfg. Co., Chicago, Ill.
Chicago Steel Tank Co., Div. of U. S. Industries, Inc., Chicago, Ill.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (plastic)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Corite Products, Inc., Chicago, Ill. (plastic)
Day Co, The, Minneapolis, Minn.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Downingtown, Pa.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elastic Porcelain Lining Corp., Rochester, N. Y. (Tank linings)
Ellicott Fabricators, Inc., Baltimore, Md.
Erie City Iron Wks., Erie, Pa.
Falstrom Co., Passaic, N. J.
Filtrine Mfg. Co., Inc., Waldwick, N. J.
Finnigan & Co., Inc., J. J., Atlanta, Ga.
Fluor Products Co., Los Angeles, Calif.
Fluor Products Co., Garland, Tex. (wooden)
Frick Co., Waynesboro, Pa.
Gabriel Boiler Co., Portland, Ore.
General Ceramics Corp., Keasbey, N. J. (chemical stoneware, plastic, & porcelain)
General Fittings Co., East Greenwich, R. I.
Goodrich Industrial Products Co., Akron, O. (Rubber lined)
Haveg Industries, Inc., Newark, Del.
Heat More Tankless Heater Co., Cambridge, Mass.
Heil Process Equipment Corp., Cleveland, Ohio
Hodge Boiler Works, East Boston, Mass.
Hoppes Mfg. Co., Inc., Springfield, O.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
International Boiler Wks., The, East Stroudsburg, Pa.
International Engineering, Inc., Dayton, O.
Kaustine Furnace & Tank Corp., Perry, N. Y.
Kellogg Co., M. W., The, New York, N. Y.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knapp Mills, Inc., Long Island City, N. Y.
Knight, Maurice A., Akron, O. (acid-proof, lined steel)
Kopperman & Sons, Joseph, Philadelphia.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lakewood Engineering & Mfg. Co., Chicago, Ill.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros. Inc., Cincinnati, O.
Lucey Boiler & Mfg. Corp., Chattanooga, Tenn.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Morrison Brothers Co., Dubuque, Ia.
Murray Iron Wks. Co., Burlington, Ia.
Newcomb-Detroit Co., Detroit, Mich.
Nooter Corp., St. Louis, Mo.
Norse Boiler Co., Inc., New Market, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (glass)
Portland Copper & Tank Works, Inc., South Portland, Me.
Quaid Fabrications, Inc., Palmyra, N. J.
Quaker City Iron Wks., Philadelphia, Pa.
Queen City Engineering Co., Charlotte, N. C.
Reco Products Div., Recony Corp., New York, N. Y.
Rheem Mfg. Co., Chicago, Ill.
Richmond Engineering Co., Richmond, Va.
Rosebraugh Co., W. W., Salem, Ore.
Roth Co., Roy E., Rock Island, Ill.
S & C Mfg. Co., Cincinnati, O. (plastics)
Scaife Co., Oakmont, Pa.
Sims Co., Erie, Pa.
Smith Corp., A. O., Milwaukee, Wis.
Spurgeon Co., Warren, Mich.
Struthers Wells Corp., Warren, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Tippett & Wood, Phillipsburg, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

Van Noorden Co., E., Boston, Mass.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., W. Hartford, Conn.
Wood Co., John, Conshohocken, Pa.
Youngstown Welding & Engineering Co., Youngstown, O.
Zingheim Co., William C., Chicago, Ill.

TAPE, DUCT, ADHESIVE, FOR SEALING JOINTS

American Tape Co., Detroit, Mich.
Arno Adhesive Tapes, Inc., Michigan City, Ind.
Continental Tapes, Cayce, S. C.
Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Goodrich Industrial Products Co., B. F., Akron, O.
Grant Wilson, Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Mortell Co., J. W., Kankakee, Ill.
Mystik Adhesive Products, Inc., Chicago, Ill.
Permacel Tape, New Brunswick, N. J.
Seamless Rubber Co., The, F. O. S. Industrial Tape Div., New Haven, Conn.
Tropical Tape Div., Ft. Lauderdale, Fla.

TAPE, INDUSTRIAL, ADHESIVE

American Tape Co., Detroit, Mich.
Arno Adhesive Tapes, Inc., Michigan City, Ind.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Corbman Bros., Inc., Philadelphia, Pa.
Dayton Rubber Co., Dayton, O.
Dearborn Tape & Label Co., Dearborn, Mich.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Durkee-Atwood Co., Minneapolis, Minn.
Gerrard & Co., A. J., Melrose Park, Ill.
Goodrich Industrial Products Co., Akron, O.
Johns-Manville, New York, N. Y.
Kendall Co., Polyken Sales Div., Chicago, Ill.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich.
Mystik Adhesive Products, Inc., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
Norton Co., Worcester, Mass.
Owens-Corning Fiberglas Corp., Toledo, O.
Pee Cee Tape & Label Co., Los Angeles, Calif. (Printed)
Permacel Tape, New Brunswick, N. J.
Plico-Flex, Los Angeles, Calif.
Products Research Co., Los Angeles, Calif.
Rubber & Plastics Compound Co., New York, N. Y. (vinyl and polyethylene)
Seamless Rubber Co., The, F.O.S. Industrial Tape Div., New Haven, Conn.
Spring Packing Corp., Chicago, Ill.
Tropical Tape Div., Ft. Lauderdale, Fla.
United Mineral & Chemical Corp., New York, N. Y.
United States Rubber Co., New York, N. Y.

TAPS, PIPE

Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Nye Tool Co., Chicago, Ill.
Threadwell Tap & Die Co., Greenfield, Mass.

TELEVISION, INDUSTRIAL, CLOSED-CIRCUIT

Diamond Power Specialty Corp., Lancaster, O.
Radio Corp. of America, Engineering Products Dept., Camden, N. J.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats; Regulators, Temperature

TEMPERATURE RECORDERS

See Recorders, Temperature

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Alco Products, Inc., Schenectady, N. Y.
Dietzgen Co., Eugene, Chicago, Ill.
Graphic Indicator Co., Los Angeles, Calif.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, DUST SPOT, FOR AIR FILTERS

Hill & Co., E. Vernon, Lake Geneva, Wis.
Research Appliance Co., Allison Park, Pa.
Trerice Co., H. O., Detroit, Mich.

TESTERS, GAGE, DEAD WEIGHT

American Instrument Co., Inc., Silver Spring, Md.
Crosby Valve & Gage Co., Wrentham, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.
Trerice Co., H. O., Detroit, Mich.

TESTERS, LEAK, FOR PIPING AND VESSELS

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Gas & Chemical, Inc., Leak-Tec Div., New York.
American Pipe & Steel Corp., Alhambra, Calif.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Farris Engineering Co., Palisades Park, N. J.
Greer Hydraulics, Inc., Jamaica, N. Y.
Johnson-Williams, Inc., Palo Alto, Calif.
Kaiser Co., E. B., Glenview, Ill.
Mechanical Products Corp., Chicago, Ill.
Universal Controls Corp., Dallas, Tex.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

TESTERS, MOISTURE

Brabender Corp., Rochelle Park, N. J. (semi-automatic)
Hill & Co., E. Vernon, Lake Geneva, Wis.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

TESTERS, FOR OIL BURNER CONTROLS

Scully Signal Co., Melrose, Mass.

TESTERS, SMOKE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
De-Tec-Tronic Corp., Chicago, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Kilgore, Inc., International Flare-Signal Div., Westerville, O.
McNeill Smoke Eliminator Co., Chicago, Ill.
Pyrene CO TWO, Newark, N. J.
Research Appliance Co., Allison Park, Pa.

TESTERS, SOUND, FOR LOCATING MECHANICAL TROUBLES

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Marsh Instrument Co., Skokie, Ill.

THAWERS, PIPE, ELECTRIC, PORTABLE

Fern, Ralph, Scranton, Pa.
Hammett Electric Mfg. Co., Kansas City, Mo.
Harold Electric Co., Walla Walla, Wash.
Hobart Bros. Co., Troy, O.
Trindl Products, Ltd., Chicago, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOMETER WELLS

See Wells, Thermometer

THERMOMETERS, INDICATING, INDUSTRIAL

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bristol Co., The, Waterbury, Conn.
Defender Instrument & Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Dillon & Co., Inc., W. C., Van Nuys, Calif.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
H-B Instrument Co., **Philadelphia, Pa.**
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Moeller Instrument Co., Richmond Hill, N. Y.
New York Air Valve Corp., Brooklyn, N. Y.
Pacific Transducer Corp., Los Angeles, Calif. (for surface temperatures)
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Partlow Corp., The, New Hartford, N. Y.
Philadelphia Thermometer Co., Philadelphia.
Powers Regulator Co., Skokie, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Royco Instruments, Albany, Calif.
Sarco Co., Inc., New York, N. Y.
Schaevitz Engineering, Camden, N. J.
Scientific Instrument Co., Detroit, Mich.
Simpson Electric Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of America Machine and Metals, Inc., Sellersville, Pa.
Velan Valve Corp., Plattsburgh, N. Y.
Victory Engineering Corp., Union, N. J.
Weksler Thermometer Corp., Freeport, N. Y.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

THERMOMETERS, INDICATING, PIPE SURFACE TEMPERATURE

Bristol Co., The, Waterbury, Conn.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Moeller Instrument Co., Richmond Hill, N. Y.
Pacific Transducer Corp., Los Angeles, Calif.
Palmer Thermometers, Inc., Cincinnati, O.
Royco Instruments, Albany, Calif.
Simpson Electric Co., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Victory Engineering Corp., Union, N. J.

THERMOMETERS, INDICATING, REMOTE-READING

Airguide Instrument Co., Chicago, Ill.
Assembly Products, Inc., Chesterland, O.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Century Instrument Co., Detroit, Mich.
Defender Instrument & Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., West Orange, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Garden City Instruments, Inc, Chicago, Ill.
Giannini & Co., Inc., G. M., Pasadena, Calif.
H-B Instrument Co., Philadelphia, Pa.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Industrial Development Laboratories, Inc., Jersey City, N. J.
Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.

Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
New York Air Valve Corp., Brooklyn, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Royco Instruments, Albany, Calif.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Simpson Electric Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Thompson Research & Mfg. Co., Davenport, Fla.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Victory Engineering Corp., Union, N. J.
Weksler Thermometer Corp., Freeport, N. Y.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

THERMOMETERS, INDICATING, WALL

Airguide Instrument Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Defender Instrument & Regulator Co., Boody, Ill.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Victory Engineering Corp., Union, N. J.
Weksler Thermometer Corp., Freeport, N. Y.
West Instrument Corp., Chicago, Ill.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

THERMOMETERS, KATA

Hill & Co., E. Vernon, Lake Geneva, Wis.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

THERMOSTAT GUARDS

See Guards, Thermostat, to Prevent Tampering

THERMOSTATS, DUCT TYPE

American District Telegraph Co., New York.
Automatic Devices Co., Inc., Western Springs, Ill.
Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Air Conditioning Div., Chatham, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif.
Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scaico Controls Inc., Delanco, N. J.
Stevens Mfg. Co., Inc., Mansfield, O.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Wesix Electric Heater Co., San Francisco.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, EFFECTIVE TEMPERATURE

Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Air Conditioning Div., Chatham, N. J.
Detroit Controls Corp., Detroit, Mich.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif. and Skokie, Ill.
H-B Instrument Co., Phiadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, RADIANT HEAT

Automatic Devices Co., Inc., Western Springs, Ill.
Ceilheat, Inc., Knoxville, Tenn.
Crystalheat Co., Van Nuys, Calif.
Detroit Controls Corp., Detroit, Mich.
Everwarm, Inc., Knoxville, Tenn.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
General Electric Co., Wiring Device Dept., Providence, R. I.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Roberson, Inc., Seattle, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sunwarm, Inc., Kingsport, Tenn.
Thrush & Co., H. A., Peru, Ind.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, ROOM OR WALL

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill .
Barber-Colman Co., Rockford, Ill.
Baso, Inc., Milwaukee, Wis.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Crystalheat Co., Van Nuys, Calif.
Detroit Controls Corp., Detroit, Mich.
Electrend Products Corp., St. Joseph, Mich.
Everwarm, Inc., Knoxville, Tenn.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Appliance Control Dept., Morrison, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
McCorkle Co., D. H., Berkeley, Calif.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Roberson Inc., Seattle, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wesix Electric Heater Co., San Francisco.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, TWO STAGE, FOR COOLING

Barber-Colman Co., Rockford, Ill.
General Controls Co., Glendale, Calif.
Mercoid Corp., The, Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Sarco Co., Inc., New York, N. Y.

THERMOSTATS, TWO STAGE, FOR HEATING

Barber-Colman Co., Rockford, Ill.
General Controls Co., Glendale, Calif.
Mercoid Corp., The, Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, SURFACE

Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Detroit Controls Corp., Detroit, Mich.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Hart Mfg. Co., Hartford, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.

Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
McCorkle Co., D. H., Berkeley, Calif.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Red Spot Electric Co., Tacoma, Wash.
Roberson Inc., Seattle, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Air Conditioning Div., Chatham, N. J.
Detroit Controls Corp., Detroit, Mich.
Fenwal Inc., Ashland, Mass.
Franklin Dales Co., Akron, O.
General Controls Co., Glendale, Calif. and Skokie, Ill.
H-B Instrument Co., Philadelphia, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Roberson Inc., Seattle, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, WEATHER COMPENSATING

Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., Detroit, Mich.
General Electric Co., Appliance Control Dept., Morrison, Ill.
Heat-Timer Corp., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
United Electric Controls Co., Watertown, Mass.
White-Rodgers Co., St. Louis, Mo. (Level-Temp)

TIME RECORDER-TOTALIZERS

See Recorder-Totalizers, Time

TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Adre Co., The, Hales Corners, Wis. (burnishers for electrical contacts)
Ampco Metal, Inc., Milwaukee, Wis.
Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind. (hack saws, files)
Badger Sales Co., Inc., Los Angeles, Calif. (magnifying inspectoscope for inspection of hard-to-get-at places)
Basford Co., H. R., San Francisco, Calif. (pliers)
Billings & Spencer Co., Hartford, Conn.
Birks Mfg. Co., Meriden, Conn. (Pittsburgh lock seam opener)
Black & Decker Mfg. Co., The, Towson, Md. (electric screw driver)
Bonney Forge & Tool Works, Allentown, Pa.
Boston Machine Works Co., Lynn, Mass. (nozzle extractor)
Brown-Brockmeyer Co., Inc., Dayton, O. (tool grinders)
Buckeye Tools Corp., Dayton, O. (Portable air wrenches and sheet metal nibblers)
Caliputer, Rancho Sante Fe, Calif. (Caliper-scale)
Cam-Lok Div., Empire Products, Inc., Cincinnati, O. (electrode holders)
Carlson Rules Branch, Henry Disston Div., H. K. Porter Co., Inc., Monrovia, Calif. (steel tape rules, diameter rules)
Collins Machinery Corp., Los Angeles, Calif.
Crescent Tool Co., Jamestown, N. Y.
Demo-Haines Tool Corp., Machine Works, Enid, Okla. (portable rotary hammer & drills)
Diamond Calk Horseshoe Co., Duluth, Minn. (wrenches)
Dreier Brothers, Inc., Chicago, Ill. (level for determining pitch of pipe; hack saws)
Duro-Dyne Corp., New Hyde Park, L. I., N. Y. (file handles and solder iron handles, punches)
Duro Metal Products Co., Chicago, Ill.
Engesser & Co., William L., El Monte, Calif. (bull bits, angle drill attachment)
Erie Tool Wks., Erie, Pa. (Vises, cutter wheels, rollers)
Fastway Fasteners, Inc., Lorain, O. (for hanging duct straps, heating units, etc. on masonry walls)
Franklin Balmar Corp., Baltimore, Md. (disc grinders)
Gel-Me Co., Bloomington, Ill. (electric sound probe for locating mechanical trouble)
Greene, Tweed & Co., North Wales, Pa.
Greenlee Tool Co., Div. of Greenlees Bros. & Co., Rockford, Ill.
Hamer-Dril Co., New York, N.Y. (attachment for electric drill to make power hammer)
Hexdall Co., A. M., Morris, Ill. (Pittsburgh lock hammers, tee hammers, seam openers)
Hilti Rapid Fastening Systems, Inc., New York, N. Y. (hammer actuated drive tools)
Howes-Wood Co., Cambridge, Mass. (hacksaws, blades, handsaws)
Hydraulic Mfg. Co., Bridgeport, Conn. (hydraulic water ram)
Hydrozion Engineering Co., Inc., Kansas City, Mo. (earth boring auger)
Independent Blade Corp., Joliet, Ill. (plastic cutting & other saw blades)
Instrument Cases, Div. of TA Mfg. Corp., Los Angeles, Calif. (instrument cases)
Jaco Devices Co., Hingham, Mass. (drill attachment for sawing, etc.)
Kass Hardware & Supply Co., Inc., Bronx, N. Y. (drills for sheet metal)
Kent-Moore Organization, Inc., Warren, Mich.
Key-Hak Div., Producers & Distributors, Inc., Allentown, Pa. (hack saw blades for portable power hack saw)
Lenco, Inc., Jackson, Mo. (electrode holders)
Lenk Mfg. Co., Franklin, Ky. (electric soldering irons)
Levow, David, Brooklyn, N. Y. (3 way clamp)
Lufkin Rule Co., Saginaw, Mich. (steel tapes and folding rules)
Matrix Engineering Corp., Minneapolis, Minn. (pneumatically operated nail driver for concrete, wood, sheet metal)
Millers Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis. (electric screw drivers and hack saws)
Misener Mfg. Co., Inc., Syracuse, N. Y. (hole saws)
Nielsen, Inc., E. V., Stamford, Conn.
Nupla Mfg. Co., Los Angeles, Calif. (hammers of all types)
Omega Products, Chicago, Ill. (pocket size voltage tester)
Owens Co., H., Culver City, Calif. (pattern developer tool for sheet metal work)
Phillips Drill Co., Michigan City, Ind. (impact hammers)
Pickett & Eckel, Inc., Alhambra, Calif. (slide rule)
Pioneer Tool Co., Racine, Wis. (scratch awls, crimping pliers, saw handles)
Port City Machine & Tool Co., Muskegon, Mich. (for closing Pittsburgh Lock)
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
R C S Tool Corp., Bloomington, Ill. (reciprocating saw attachment; right angle drill attachments)
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., Cleveland, O. (Powder-actuated tools, hammer)
Rawlplug Co., Inc., The, New Rochelle, N. Y. (drills for masonry)
Refrigeration Devices Co., Nutley, N. J. (oiler for refrigeration compressors)
Reiner & Campbell Co., Inc., Newark, N. J. (Dividers, drive cleat notchers)
Remington Arms Co., Inc., Bridgeport, Conn. (powder-actuated tools)
Richmont, Inc., Monrovia, Calif.
Rotary Concrete Drill Co., Pasadena, Calif. (Drill bits)
Rotor Tool Co., Cleveland, O.
Salsbury Corp., Los Angeles, Calif. (air hammer)
Scharf Mfg. Co., J. H., Omaha, Nebr. (magnesium levels)
Schild Mfg. Co., Milwaukee, Wis.
Skinner Co., M. B., South Bend, Ind. (pipe drilling adapter)
Snap-on Tools Corp., Kenosha, Wis.
Stanley Works, The, New Britain, Conn.
Superior Valve & Fittings Co., Pittsburgh, Pa. (wrenches, valving, hand)
Thompson & Son Co., The Henry G., New Haven, Conn.
Walton Co., Hartford, Conn. (pipe and stud extractors)
Wassco Electric Products Corp., Joliet, Ill. (soldering pliers for copper tubing)
Williams & Co., J. H., Buffalo, N. Y.
Wodack Electric Tool Corp., Chicago, Ill. (hammers, electric; groovers, plaster)
Yeats Appliance Dolly Sales Co., Milwaukee, Wis. (dolly for moving equipment upstairs)

TOOLS, FLARING, FOR TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Engesser & Co., William L., El Monte, Calif.
Erie Tool Works, Erie, Pa.
Fine Products Co., Berwyn, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kent-Moore Organization, Inc., Warren, Mich.
Madden Brass Products Co., Aurora, Ill.
Mueller Co., Decatur, Ill.
Nye Tool Co., Chicago, Ill.
Penn Brass & Copper Co., Erie, Pa.
Research Vacuum Supply Co., Chicago, Ill. (Press gears)
Sac Tool Mfg. Co., St. Louis, Mo.
Schaul Mfg. Co., Cleveland, Ohio
Snap-On Tools Corp., Kenosha, Wis.
Span Brass Mfg. Co., Otsego, Mich.
Talon Tools, Inc., North Arlington, N. J.
Tube & Hose Fittings Div., Parker-Hannifin Corp., Cleveland, O.
Williams & Co., J. H., Buffalo, N. Y.
Wilson Co., K. R., Arcade, N. Y.
Wilson, Inc., Thomas C., Long Island City, N. Y.
Wilson Manufacturing Co., Memphis, Tenn.

TORCHES, BRAZING SOLDERING AND WELDING

Aeroil Products Co., Inc., South Hackensack, N. J.
Aeroprojects, Inc., West Chester, Pa.
Air Reduction Co., Inc., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Atlas Welding Accessories, Inc., Ferndale, Mich.
Bernz Co., Otto, Rochester, N. Y.

Borm Mfg. Co., Elgin, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, N. Y.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Industries, Inc., Sycamore, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
K-G Equipment Co., Allentown, Pa.
Lee Co., K. O., Aberdeen, S. D.
Lenk Mfg. Co., Franklin, Ky.
Lincoln Electric Co., The, Cleveland, O.
Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Mid-States Welder Mfg. Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Moorhead, Minn.
Modern Engineering Co., St. Louis, Mo.
Mutual Liquid Gas & Equipment Co., Gardena, Calif.
National Cylinder Gas Co., Chicago, Ill.
Prepo Corp., Edgerton, Wis.
Ransome Co., Emeryville, Calif.
Reiner & Campbell Co., Inc., Newark, N. J.
Research Vacuum Supply Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Seelye Craftsmen, The, Minneapolis, Minn. (for welding plastics)
Selas Corp of America, Dresher, Pa.
Sight Feed Generator Co., West Alexandria, O.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Velocity Power Tool Co., Div. of Mine Safety Appliances Co., Pittsburgh, Pa.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Weldit, Inc., Detroit, Mich. (for L-P gas, also oxy-acetylene)
Will-Weld Mfg. Co., Inc., Omaha, Neb.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC DRAFT

American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Dover Mfg. Co., Independence, Mo.
Fluor Products Co., Whittier, Calif.
Fluor Products Co., Garland, Tex.
Galloway Co., G. W., Cooling Tower Div., Arcadia, Calif.
Harry Cooling Towers, Inc., New York, N. Y.
Koch Engineering Co., Inc., Wichita, Kans.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., The, Kansas City, Mo.
Peerless Products Div., United Cooling Towers, Inc., N. Little Rock, Ark.
Phillips Cooling Tower Co., Inc., Brooklyn.
Pritchard & Co. of California, J. F., Kansas City, Mo.
Stewart Ice Machine Co., Pomona, Calif.
Sun-Fire Stoker Corp., New Albany, Ind.
Thermal Agency, Houston, Tex.
TOT Towers, Inc., Houston, Tex.
Toungate & Coats, Austin, Tex.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Watkins Co., J. E., Maywood, Ill.

TOWERS, COOLING, LIQUID JET ACTION, DRAFT

Koch Engineering Co., Wichita, Kans.

TOWERS, COOLING, MECHANICAL DRAFT

Acme Industries, Inc., Jackson, Mich.
Air Purification Service, Inc., New York, N. Y.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
American Coils Co., Farmingdale, N. J.
American Cooling Tower Co., Kansas City, Mo.
Arkla Air Conditioning Corp., Evansville, Ind.
Ayres, Inc., Houston, Tex.
Baldwin Ward Mfg. Co., Inc., Ottawa, Ks.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Binks Mfg. Co., Chicago, Ill.
Blazer & Son, M., Passaic, N. J.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Cool-Ette, Inc., Detroit, Mich.
Curtis Mfg. Co., Refrigeration Div., St. Louis.
Deansteel Products Co., San Antonio, Tex.
Degree Corp., Kansas City, Mo.
Dover Mfg. Co., Independence, Mo.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Fluor Products Co., Whittier, Calif.
Fluor Products Co., Garland, Tex.
Foster Wheeler Corp., New York, N. Y.
Galloway Co., G. W., Cooling Tower Div., Arcadia, Calif.
Goodfellow Co., Inc., E. D., Memphis, Tenn.
Governair Corp., Oklahoma City, Okla.
Halstead & Mitchell, Pittsburgh, Pa.
Harry Cooling Towers, Inc., New York, N. Y.
Havens Cooling Towers, Div. of Havens Structural Steel Co., Kansas City, Mo.
Kennard Corp., St. Louis, Mo.
Knobco Inc., Newport, Ky.
Koch Engineering Co., Inc., Wichita, Kans.
Kramer Trenton Co., Trenton, N. J.
Krueger Air Conditioning Co., Tucson, Ariz.
Lakewood Engineering & Mfg. Co., Chicago, Ill.
Larkin Coils, Inc., Atlanta, Ga.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., The, Kansas City, Mo.
Marlo Coil Co., St. Louis, Mo.
Master-Bilt Refrigeration Mfg. Co., St. Louis, Mo.
Mayer Refrigerating Engineers, Inc., Lincoln Park, N. J.
McQuay, Inc., Minneapolis, Minn.
Morris Sheet Metal Works, Columbus, O.
Niagara Products Co., Phoenix, Ariz.
Peerless Products Div., United Cooling Towers, Inc., N. Little Rock, Ark.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Pritchard & Co. of California, J. F., Kansas City, Mo.
Reco Products Div., Recony Corp., New York, N. Y.
Recold Corp., Los Angeles, Calif.
Refrigeration Appliances, Inc., Chicago, Ill.
S & C Mfg. Co., Cincinnati, O.
Schancke, Inc., Evansville, Ind.
Silvercraft, Inc., Louisville, Ky.
Sun-Fire Stoker Corp., New Albany, Ind.
Tedco Cooling Towers, Div. of Engineering & Development Co., Inc., St. Louis, Mo.
TOT Towers, Inc., Houston, Tex.
Toungate & Coats, Austin, Tex.
Vogt Machine Co., Henry, Louisville, Ky. (packaged unit with condenser, pump, etc.)
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.

TOWERS, COOLING, NOISE ELIMINATION FOR

See Noise Elimination for Cooling Towers

TRANSFORMERS, ELECTRIC

Acme Electric Corp., Cuba, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arjac Products Inc., Rochester, N. Y.
Central Transformer Corp., Pine Bluff, Ark.
Crown Controls Co., Inc., New Bremen, O.
Dormeyer Industries, Chicago, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Essex Wire Corp., Ft. Wayne, Ind.
General Controls Co., Glendale, Calif., and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hammett Electric Mfg. Co., Kansas City, Mo.
Jefferson Electric Co., Bellwood, Ill.
Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Rex Welder Co., Benton Harbor, Mich.
Schaevitz Engineering, Camden, N. J.
Sola Electric Co., Chicago, Ill. (voltage regulating)
Sperti Faraday, Inc., Adrian, Mich.
Taylor-Winfield Corp., Warren, O.
Thermador Electrical Mfg., Los Angeles, Calif.
Trindl Products, Ltd., Chicago, Ill.
Union Electric & Mfg. Co., Jersey City, N. J. (ignition)
Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis. (oil burner)
Westinghouse Electric Corp., Pittsburgh, Pa.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

TRANSMITTERS, FLOW

Barton Instrument Corp., Los Angeles, Calif.
Brooks Rotameter Co., Lansdale, Pa.

TRANSMITTERS, PRESSURE AND TEMPERATURE

Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
United States Gauge Div. of American Machine and Metals Inc., Sellersville, Pa.

TRAPS, MAGNETIC, FOR REMOVING TRAMP IRON FROM PIPE LINES

Columbia Engineering Service Co., Santa Rosa, Calif.
Dings Magnetic Separator Co., Milwaukee.
Ladish Co., Tri-Clover Div., Kenosha, Wis.

TRAPS, STEAM, FLOAT-THERMOSTATIC

Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Newtonville, Mass.
Cashin Co., W. D., Boston, Mass.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Cochrane Corp., Philadelphia, Pa.
Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
Davis Regulator Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Haines Co., Inc., Wm. S., Div. Sellers Injector Corp., Philadelphia, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Owens & Co., Inc., Henry, Cranston, R. I.
Sarco Co., Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Trerice Co., H. O., Detroit, Mich.
Velan Valve Corp., Plattsburgh, N. Y.
Vis-A-Plug, Inc., King of Prussia, Pa.
Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

TRAPS, STEAM, LIFT

Clark Mfg. Co., Cleveland, O.
L. R. P. Corp., Liecester, N. Y.
Morehead Moisture Control, Detroit, Mich.
Sarco Co., Inc., New York, N. Y.
Velan Valve Corp., Plattsburgh, N. Y.

TRAPS, STEAM, MECHANICAL

Acker Corp., Meridian, Miss.
Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Armstrong Machine Wks., Three Rivers, Mich.

Bailey Co., Chas. M., San Francisco, Calif.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Coe Mfg. Co., Painesville, O.
Crane Co., Chicago, Ill.
Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Haines Co., Inc., Wm. S., Div. Sellers Injector Corp., Philadelphia, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Leavitt Machine Co., Orange, Mass.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Monash-Younker Co., Inc., Chicago, Ill.
Morehead Moisture Control, Detroit, Mich.
Nason Co., Clarkston, Mich.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Perfecting Service Co., Charlotte, N. C.
Sarco Co., Inc., New York, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond, Cleveland, O.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Vis-A-Plug, Inc., King of Prussia, Pa. (bucket only)
Watson & McDaniel Co., Philadelphia, Pa.
Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., Inc., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, PUMPING

Clark Mfg. Co., Cleveland, O.
Johnson Corp., The, Three Rivers, Mich.
Sarco Co., Inc., New York, N. Y.

TRAPS, STEAM, RADIATOR

Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Velan Valve Corp., Plattsburgh, N. Y.

TRAPS, STEAM, THERMOSTATIC

Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Barnes & Jones, Inc., Newtonville, Mass.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
Dunham-Bush, Inc., West Hartford, Conn.
Haines Co., Inc., Wm. S., Div. Sellers Injector Corp., Philadelphia, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Strong,Carlisle & Hammond, Cleveland, O.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Velan Valve Corp., Plattsburgh, N. Y.
Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

TRAPS, WATER, FOR OIL TANKS

Clark Mfg. Co., Cleveland, O.

TREATMENT, CHEMICAL, TO REMOVE SCALE

Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Berna Corp., Garwood, N. J.
Calgon Co., Pittsburgh, Pa.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hall Laboratories, Pittsburgh, Pa.
Jeffrey Mfg. Co., Columbus, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
North American Mogul Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Pennsalt Chemicals Corp., Philadelphia, Pa.
Perolin Co., Inc., The, New York, N. Y.
Salsbury Corp., Los Angeles, Calif.

TREATMENT, FUEL OIL, TO PREVENT SLUDGE

Allen Co., Robert G., Mechanicsville, N. Y.
American Sand-Banum Co., Inc., Freeport, N. Y.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Bird-Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Eds-Wil Burner Corp., Chicago, Ill.
Elraco Engineering Co., Los Angeles, Calif.
Evis Mfg. Co., Chicago, Ill.
Hercules Chemical Co., Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Monsanto Chemical Co., St. Louis, Mo.
Montgomery Chemical Co., Jenkintown, Pa.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Nutmeg Chemical Co., New Haven, Conn.
Perolin Co., Inc., New York, N. Y.
Petroleum Solvents Corp., New York, N. Y.
Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Sudbury Laboratory, Sudbury, Mass.
Warren Refining & Chemical Co., The, Cleveland, O.
Winslow Engineering & Mfg. Co., Oakland, Calif.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American K. A. T. Corp., Garwood, N. J.
American Water Softener Co., Philadelphia, Pa.
American Well Wks., Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Berna Corp., Garwood, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown-Electro Co., Oklahoma City, Okla.
Calgon Co., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Solvent Co., Birmingham, Ala.
Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Elgin Softener Corp., Elgin, Ill.
Elraco Engineering Co., Los Angeles, Calif.
Graver Water Conditioning Co., New York, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hall Laboratories, Pittsburgh, Pa.
Heller Laboratories, Inc., Leonia, N. J.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Madison, N. J.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Packard Mfg. Co., Jacksonville, Fla.
Perolin Co., Inc., New York, N. Y.
Proportioneers, Inc., Div. of B-I-F Industries, Inc. Providence, R. I.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Smith Chemical Co., E. W., La Puente, Calif.
Stiles Karlsonite Corp., Waukegan, Ill.
Strong, Carlisle & Hammond, Cleveland, O.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Warren Refining & Chemical Co., Cleveland, O.
Water Treatment Co. of America, Pittsburgh, Pa.

TREATMENT, WATER, TO INHIBIT CORROSION

Agava Products, Inc., Jersey City, N. J.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Sand-Banum Co., Inc., Freeport, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Ferr-X Corp., Clifton, N. J.
Aquatrol Laboratories, Inc., Clifton, N. J.
Berna Corp., Garwood, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Calgon Co., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Cepi-American, Inc., River Forest, Ill.
Chemical Solvent Co., Birmingham, Ala.
Clayton Mfg. Co., El Monte, Calif.
Cochrane Corp., Philadelphia, Pa.
Culligan, Inc., Northbrook, Ill.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Electro Rust-Proofing Corp., Belleville, N. J.
Electro Tool Corp., Houston, Tex.
Elgin Softener Corp., Elgin, Ill.
Elraco Engineering Co., Los Angeles, Calif.
Fischer & Porter Co., Hatboro, Pa.
Garman Co., Inc., The, St. Louis, Mo.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hall Laboratories, Pittsburgh, Pa.
Heller Laboratories, Inc., Leonia, N. J.
Hungerford & Terry, Inc., Clayton, N. J.
Industrial Filter & Pump Co., Chicago, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Layne & Bowler, Inc., Memphis, Tenn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McMillan Industrial Supplies, C. C., Portland, Ore.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Monsanto Chemical Co., St. Louis, Mo.
Moreheat Distribution, Inc., Cincinnati, O.
Narda Ultrasonics Corp., Mineola, Long Island, N. Y.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y:
Oshkosh Filter & Softener Co., Oshkosh, Wis.
Permutit Co., New York, N. Y.
Perolin Co., Inc., New York, N. Y.
Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Reynolds Water Conditioning Co., Detroit, Mich.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Salsbury Corp., Los Angeles, Calif.
Saverite Engineering Co., Hoboken, N. J.

Smith Chemical Co., E. W., La Puente, Calif.
Stiles Karlsonite Corp., Waukegan, Ill.
Strong, Carlisle & Hammond, Cleveland, O.
Sudbury Laboratory, Sudbury, Mass.
Sulfio, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va.
Wallace & Tiernan, Inc., Belleville, N. J.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Wyandotte Chemical Co., Wyandotte, Mich.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, TO PREVENT SCALE FORMATION

Agava Products, Inc., Jersey City, N. J.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Sand-Banum Co., Inc., Freeport, N. Y.
American Water Softener Co., Philadelphia.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol **Ferr-X Corp., Clifton, N. J.**
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown-Electro Co., Oklahoma City, Okla.
Calgon Co., Pittsburgh, Pa.
Cepi-American, Inc., River Forest, Ill.
Chemical Solvent Co., Birmingham, Ala.
Clayton Mfg. Co., El Monte, Calif.
Cochrane Corp., Philadelphia, Pa.
Culligan, Inc., Northbrook, Ill.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Electro Tool Corp., Houston, Tex.
Elraco Engineering Co., Los Angeles, Calif.
Evis Mfg. Co., Chicago, Ill.
Garman Co., Inc., The, St. Louis, Mo.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hall Laboratories, Pittsburgh, Pa.
Heller Laboratories, Inc., Leonia, N. J.
Hungerford & Terry, Inc., Clayton, N. J.
Illinois Water Treatment Co., Rockford, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Madden Corp., Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McMillan Industrial Supplies, C. C., Portland, Ore.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Narda Ultrasonics Corp., Mineola, Long Island, N. Y.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Olin Mathieson Chemical Corp., Industrial Chemicals Div., Baltimore, Md.
Oshkosh Filter & Softener Co., Oshkosh, Wis.
Pacific Lumber Co., The, San Francisco, Calif.
Packard Water Conditioners, Inc., Jacksonville, Fla.
Permutit Co., New York, N. Y.
Perolin Co., Inc., The, New York, N. Y.
Reynolds Water Conditioning Co., Detroit, Mich.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Smith Chemical Co., E. W., La Puente, Calif.
Stiles Karlsonite Corp., Waukegan, Ill.
Strong, Carlisle & Hammond, Cleveland, O.
Uniflow Mfg. Co., Erie, Pa.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Winslow Engineering & Mfg. Co., Oakland, Calif.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

Agava Products Inc., Jersey City, N. J.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson Chemical Co., Inc., Macon, Ga.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Berna Corp., Garwood, N. J.
Bird-Archer Co., Philadelphia, Pa.
Builders Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Calgon Co., Pittsburgh, Pa.
Carolina Aniline & Extract Co., Charlotte, N. C.
Chemical Solvent Co., Birmingham, Ala.
Dearborn Chemical Co., Chicago, Ill.
Dow Chemical Co., The, Midland, Mich.
Drew & Co., Inc., E. F., New York, N. Y.
Elraco Engineering Co., Los Angeles, Calif.
Filtrine Mfg. Co., Inc., Waldwick, N. J.
Fischer & Porter Co., Hatboro, Pa.
Garman Co., Inc., The, St. Louis, Mo.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hall Laboratories, Pittsburgh, Pa.
Hanovia Chemical & Mfg. Co., Newark, N. J. (ultraviolet)
Heller Laboratories, Inc., Leonia, N. J.
Hungerford & Terry, Inc., Clayton, N. J.
Jeffrey Mfg. Co., Columbus, O.
Layne & Bowler, Inc., Memphis, Tenn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metal & Thermit Corp., Rahway, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Monsanto Chemical Co., St. Louis, Mo.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Norwood Associated Engineers, Inc., Springfield, Mass.
Oakite Products, Inc., New York, N. Y.
Permutit Co., New York, N. Y.
Pennsalt Chemicals Corp., Philadelphia, Pa.
Perolin Co., Inc., New York, N. Y.
Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Sherwood Water Treatment Co., Inc., Beverly, N. J.
Smith Chemical Co., E. W., La Puente, Calif.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Steelcote Mfg. Co., St. Louis, Mo.
Stiles Karlsonite Corp., Waukegan, Ill.
Strong, Carlisle & Hammond, Cleveland, O.
Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va.
Wallace & Tiernan, Inc., Belleville, N. J.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.

TRENCHING MACHINES FOR PIPE LINES

See Machines, Trenching for Pipe Lines

TRUCKS, LIFT

American Pulley Co., The, Philadelphia, Pa.
Buda Div., The, Allis-Chalmers Mfg. Co., Harvey, Ill.
Oster Mfg. Co., Cleveland, O.
Thern Machine Co., Winona, Minn.

TRY-COCKS, BOILER

Crane Co., Chicago, Ill.
Diamond Power Specialty Corp., Lancaster, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ernst Water Column & Gauge Co., Livingston, N. J.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Skokie, Ill.
Lunkenheimer Co., Cincinnati, O.
New York Air Valve Corp., Brooklyn, N. Y.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.
Swift Lubricator Co., Inc., Elmira, N. Y.

TUBE CLEANERS

See Cleaners, Tube

TUBE FINNING MACHINES

See Machines, Tube Finning

TUBES, BOILER

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
H & H Tube & Mfg. Co., Detroit, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Sawhill Tubular Products, Inc., Sharon, Pa.
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis. (stainless)

TUBES, CONDENSER

American Brass Co., Waterbury, Conn.
Ampco Metal, Inc., Milwaukee, Wis.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Chase Brass & Copper Co., Waterbury, Conn.
Clayton Mark & Co., Evanston, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
Edwards Engineering Corp., Pompton Plains, N. J.
Lewin-Mathes Co., Div. of Cerro de Pasco Corp., St. Louis, Mo.
National Tube Div., United **States Steel Corp., Pittsburgh**, Pa.
Pacific Tube Co., Los Angeles, Calif.
Penn Brass & Copper Co., Erie, Pa.
Phelps Dodge Copper Products Corp., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Revere Copper and Brass Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Roberts Tube Div., Prestyle Mfg. Co., Detroit, Mich.
Sawhill Tubular Products, Inc., Sharon, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn. (copper base)
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis. (stainless)
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.

TUBES, PITOT

Aerotech Specialties, Inc., Glastonbury, Conn.
Defender Instrument and Regulator Co., Boody, Ill.
Dwyer Mfg. Co., F. W., Michigan City, Ind.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Meriam Instrument Co., The, Cleveland, O.
Simplex Valve & Meter Co., Lancaster, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

TUBING, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
Aluminum Tubing Co., Jacksonville, Fla.
American Brass Co., Waterbury, Conn.
Bohn Aluminum & Brass Corp., Detroit, Mich.

Brass & Copper Imports, Inc., Minneapolis, Minn.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
H & H Tube & Mfg. Co., Detroit, Mich.
Harvey Aluminum, Torrance, Calif.
Kaiser Aluminum & Chemical Sales, Inc., Chicago, Ill.
Penn Brass & Copper Co., Erie, Pa.
Revere Copper and Brass Inc., New York, N. Y.
Roberts Tube Div., Prestyle Mfg. Co., Detroit, Mich.
Reynolds Metals Co., Louisville, Ky.
Sawhill Tubular Products, Inc., Sharon, Pa.
Swepco Tube Corp., Clifton, N. J.
United Wire & Supply Corp., Cranston, R. I.
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.
Youngstown Welding & Engineering Co., Youngstown, O.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Bridgeport Brass Co., Bridgeport, Conn.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Gardiner Metal Co., Chicago, Ill.
H & H Tube & Mfg. Co., Detroit, Mich.
Hussey & Co., C. G., Div. of Copper Range Co., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn. (Chrome plated)
Kensico Tube Co., Mt. Kisco, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead covered)
Lewin-Mathes Co., Div. of Cerro de Pasco Corp., St. Louis, Mo.
Mueller Co., Decatur, Ill.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., New York, N. Y.
Reading Tube Corp., New York, N. Y.
Revere Copper and Brass Inc., New York, N. Y.
Roberts Tube Div., Prestyle Mfg. Co., Detroit, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J. (K-L-M)
United Wire & Supply Corp., Cranston, R. I.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.
Young Regulator Co., Cleveland, O.

TUBING, BRONZE

American Brass Co., Waterbury, Conn.
Ampco Metal, Inc., Milwaukee, Wis.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Revere Copper and Brass Inc., New York, N. Y.

TUBING, CAPILLARY

Allin Mfg. Co., Chicago, Ill.
American Brass Co., Waterbury, Conn.
American Metal Hose Div., American Brass Co., The, Waterbury, Conn.
Brass & Copper Imports, Inc., Minneapolis, Minn.
Kenisco Tube Co., Mt. Kisco, N. Y.
Madden Brass Products Co., Aurora, Ill.
Penn Brass & Copper Co., Erie, Pa.
Reading Tube Corp., New York, N. Y.
Refrigeration Research, Inc., Brighton, Mich.
Revere Copper and Brass Inc., New York, N. Y.
Sawhill Tubular Products, Inc., Sharon, Pa.
Superior Tube Co., Norristown, Pa.
Techniflex Corp., Port Jervis, N. Y.
United Wire & Supply Corp., Cranston, R. I.
Wabash Corp., Chicago, Ill.
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.

TUBING CUTTERS

See Cutters, Tubing

TUBING, DUPLEX

American Brass Co., Waterbury, Conn. (copper/steel admiralty/ steel)
Bridgeport Brass Co., Bridgeport, Conn. (copper steel, admiralty steel)
Phelps Dodge Copper Products Corp., New York, N. Y. (copper alloy)
Polymer Corp. of Pa., The, Reading, Pa. (nylon)
Republic Steel Corp., Steel & Tubes Div., Cleveland, O. (Steel and copper)
Wolverine Tube, Div. of Calumet & Hecla, Inc., Allen Park, Mich.

TUBING, FABRIC, FLEXIBLE

Arrowhead Products, Div. of Federal Mogul-Bower-Bearings, Inc., Long Beach, Calif.
Flexible Tubing Corp., Guilford, Conn.
Johns-Manville, New York, N. Y.

TUBING, FINNED

Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, Massillon, O.
Heat-X Inc., Brewster, N. Y.
Heatron, Inc., York, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lewis & Saunders, Lakeport, N. H.
McCord Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Reading Tube Corp., New York, N. Y.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Sawhill Tubular Products, Inc., Sharon, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Tenney Engineering, Inc., Union, N. J.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
United Machinery Sales Co., Chicago, Ill.
United Wire & Supply Corp., Cranston, R. I.
Vapor Heating Corp., Chicago, Ill.
Vulcan Radiator Co., Hartford, Conn.
Wall Tube & Metal Products Co., Newport, Tenn.
Wolverine Tube, Div. of Calumet and Hecla, Inc., Allen Park, Mich. (Aluminum, copper)

TUBING, MAGNESIUM

Dow Chemical Co., The, Midland, Mich.

TUBING, METAL, FLEXIBLE

American Metal Hose Div., American Brass Co., The, Waterbury, Conn.
Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.
Atlantic Metal Hose Co., Inc., New York.
Cobra Metal Hose Div., Chicago, Ill.
Crescent Insulated Wire & Cable Co., Trenton, N. J. (cabled)
Flexaust Co., New York, N. Y.
Flexonics Corp., Maywood, Ill.
International Metal Hose Co., Bellevue, O.
Johnson Metal Hose, Inc., Waterbury, Conn.
Marquette Coppersmithing Co., Philadelphia.
National Lead Co., New York, N. Y.
Packless Metal Hose, Inc., Mt. Vernon, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Titeflex, Inc., East Springfield, Mass.
U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
United Metal Hose Co., Inc., Long Island City, N. Y.
Universal Metal Hose Co., Chicago, Ill.

TUBING, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bart Mfg. Corp., Belleville, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Damascus Tube Co., Greenville, Pa.
Electric Steel Foundry Co., Portland, Ore.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Greenville Tubes, Inc., Greenville, Pa.
International Nickel Co., Inc., The, New York, N. Y.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Revere Copper and Brass, Inc., New York, N. Y.
Sawhill Tubular Products, Inc., Sharon, Pa.
Superior Tube Co., Norristown, Pa.
Swepco Tube Corp., Clifton, N. J.
Titeflex, Inc., East Springfield, Mass.
Trent Tube Co., East Troy, Wis.
United Wire & Supply Corp., Cranston, R. I.
Wolverine Tube, Div. of Calumet and Hecla, Inc., Allen Park, Mich.
Youngstown Welding & Engineering Co., Youngstown, O.

TUBING, NICKEL PLATED

Bart Mfg. Corp., Belleville, N. J.
Nikoh Tube Co., Chicago, Ill.

TUBING, PLASTIC

Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Agile Corp., Bedford, O. (flexible)
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Anesite Co., Chicago, Ill. (polyethylene, butyrate)
Bakelite Co., Div. of Union Carbide & Carbon Chemical Co., New York, N. Y.
Bolta Products, A Div. of General Tire & Rubber Co., Lawrence, Mass. (PVC)
Carlon Products Corp., Cleveland, O.
Chicago Gasket Co., Chicago, Ill.
Commercial Plastics Co., Chicago, Ill.
Continental Can Co., Millsplastic Pipe Div., New York, N. Y.
Continental-Diamond Fibre Corp., Newark, Del.
Crane Co., Chicago, Ill.
Crescent Insulated Wire & Cable Co., Trenton, N. J. (polyethylene)
Crescent Plastics, Inc., Evansville, Ind. (flexible)
Danielson Mfg. Co., Danielson, Conn. (nylon)
Extruded Plastics, Inc., Norwalk, Conn.
Flexible Tubing Corp., Guilford, Conn.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y. (teflon)
Gates Rubber Co., The, Denver, Colo.
General Electric Co., Laminated Products Dept., Coshocton, O. (phenolic laminated)
Goodrich Industrial Products Co., B. F., Akron, O. (flexible and rigid)
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O. (PVC; flexible)
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hartwell & Son, Inc., H. N., Boston, Mass. (PVC)
Haveg Industries, Inc., Newark, Del. (teflon)
Hudson Industries, Inc., Detroit, Mich.
Imperial Brass Mfg. Co., Chicago, Ill. (polyethylene and nylon)
Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J.
Jaco Mfg. Co., Cleveland, O.
Jarrow Products, Chicago, Ill. (vinyl plastic)
LaFavorite Rubber Mfg. Co., Hawthorne, N. J. (rigid, PVC)
Luzerne Rubber Co., Trenton, N. J. (hard rubber)
Manufacturers Corp., Mansfield, O.
Moore & Co., Samuel, Mantua, O. (polyethylene)
Mueller Brass Co., Port Huron, Mich. (polyethylene and PVC)
Munray Products, Inc., Cleveland, O. (polyethylene, vinyl)
National Tube Div., United States Steel Corp., Pittsburgh, Pa. (polyethylene flexible polyvinyl chloride rigid)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif. (fibre and bakelite)
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif. (butyrate; polyethylene; acrylic; PVC; rigid; flexible PVC; cycolac; kralastic; nylon; styrene)
Polymer Corp. of Pa., The, Reading, Pa. (Nylon)
Pyramid Plastics, Inc., Chicago, Ill. (saran)
Reflin Co., San Diego, Calif. (rigid, reinforced with glass fibers)

Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O. (Vinyl)
Resistoflex Corp., Roseland, N. J.
Ryerson & Son, Inc., Joseph T., Chicago, Ill. (PVC)
Sandee Mfg. Co. Chicago, Ill. (all thermoplastic)
Saran Lined Pipe Co., Ferndale, Mich. (saran)
Skyline Industries Sales, Inc., Titusville, Pa.
Southern Plastics Co., Columbia, S. C. (rigid, non-rigid)
Texas Vitrified Pipe Co., Mineral Wells, Tex. (tenite, polyethylene)
Titeflex, Inc., East Springfield, Mass. (Teflon)
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J. (flexible polyethylene, semi-rigid, rigid high impact)
United States Rubber Co., New York, N. Y. (extruded)
United States Stoneware Co., New York.
United States Stoneware Co., Plastics & Synthetics Div., Akron, O.
Vanton Pump & Equipment Corp., Hillside, N. J. (vinyl-Polethylene)
Western Plastics Corp., Tacoma, Wash. (polyethylene)
Yardley Plastics Co., Columbus, O. (polyethylene, black and natural)

TUBING, RUBBER

Garlock Packing Co., Palmyra, N. Y.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hewitt-Robins, Inc., Stamford, Conn.
Jarrow Products, Chicago, Ill. (sponge)
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
United States Rubber Co., New York, N. Y. (extruded)

TUBING, SILVER CLAD AND SILVER ALLOY

American Platinum Wks., Newark, N. J.
Baker & Co., Inc., Newark, N. J.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.

TUBING, STEEL, ALLOY, SEAMLESS

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Greenville Tubes, Inc., Greenville, Pa.
H & H Tube & Mfg. Co., Detroit, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, ALLOY, WELDED

Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
Duraloy Co., Scottdale, Pa.
H & H Tube & Mfg. Co., Detroit, Mich.
Laclede Steel Co., St. Louis, Mo.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Swepco Tube Corp., Clifton, N. J.
Trent Tube Co., East Troy, Wis.
Youngstown Sheet & Tube Co., Youngstown, O.
Youngstown Welding & Engineering Co., Youngstown, O.

TUBING, STEEL, BRAZED

Bundy Tubing Co., Detroit, Mich.
Sawhill Tubular Products, Inc., Sharon, Pa.

TUBING, STEEL, SEAMLESS

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Central Steel & Wire Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Phoenix Iron & Steel Co., Phoenixville, Pa.
Pittsburgh Steel Co., Phoenix Steel Tube Div., Pittsburgh, Pa.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Tubing Co., Jacksonville, Fla.
American Cast Iron Pipe Co., Birmingham, Ala.
Autoclave Engineers Sales Corp., Erie, Pa.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Central Steel & Wire Co., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
Electric Steel Foundry Co., Portland, Ore.
Greenville Tubes, Inc., Greenville, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Standard Tube Co., Detroit, Mich.
Superior Tube Co., Norristown, Pa.
Swepco Tube Corp., Clifton, N. J.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Wall Tube & Metal Products Co., Newport, Tenn.
Youngstown Welding & Engrg. Co., Youngstown, O.

TUBING, STEEL, WELDED

Aluminum Tubing Co., Jacksonville, Fla.
American Pipe & Steel Corp., Alhambra, Calif.
Armco Steel Corp., Middletown, O.
Avon Tube Div., Highbie Mfg. Co., Rochester, Mich.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bundy Tubing Co., Detroit, Mich. (solder coated)
Central Steel & Wire Co., Chicago, Ill.
Chicago Metal Mfg. Co., Chicago, Ill.
Clayton Mark & Co., Evanston, Ill.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
H-P Products, Inc., Louisville, O.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (electricwelded)
Laclede Steel Co., St. Louis, Mo.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Nikoh Tube Co., Chicago, Ill.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Tube Co., Pittsburgh, Pa.
Radiant Heat and Cooling Co., Santa Clara, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Revere Copper and Brass, Inc., New York, N. Y.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Sawhill Tubular Products, Inc., Sharon, Pa.
Sharon Steel Corp., Sharon, Pa.
South Chester Tube Co., Philadelphia, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Detroit, Mich.
Swepco Tube Corp., Clifton, N. J.
Trent Tube Co., East Troy, Wis.
Wheatland Tube Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.
Youngstown Welding & Engineering Co., Youngstown, O.

TUBING, TITANIUM

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
Harvey Aluminum, Torrance, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Sawhill Tubular Products, Inc., Sharon, Pa.
Superior Tube Co., Norristown, Pa.
Swepco Tube Corp., Clifton, N. J.
Trent Tube Co., East Troy, Wis.
Youngstown Welding & Engineering Co., Youngstown, O.

TUBING, ZIRCONIUM

Babcock & Wilcox Co., The, Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Damascus Tube Co., Greenville, Pa.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Sawhill Tubular Products, Inc., Sharon, Pa.
Superior Tube Co., Norristown, Pa.
Trent Tube Co., East Troy, Wis.
Wolverine Tube, Div. of Calumet and Hecla, Inc., Allen Park, Mich.
Youngstown Welding & Engineering Co., Youngstown, O.

TURBINES, MECHANICAL DRIVE

Carling Turbine Blower Co., Worcester, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dean Hill Pump Co., Indianapolis, Ind.
Elliott Co., Jeannette, Pa.
General Electric Co,. Apparatus Sales Div., Schenectady, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
Pyle-National Co., The, Chicago, Ill.
Solar Aircraft Co., San Diego, Calif.
Steam Turbine Div., Worthington Corp., Wellsville, N. J.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiton Machine Co., New London, Conn.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Worthington Corp., East Orange, N. J.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

ULTRASONIC DUST AND FUME COLLECTION

See Collection, Dust and Fume, Ultrasonic

ULTRASONIC TESTING

See Equipment, Ultrasonic Testing

ULTRAVIOLET LAMPS

See Lamps, Sterilizing for Duct Installation; Units, Sterilizing, Air

UNDERGROUND PIPING

See Conduit, Underground Piping

UNDERWATER HEATERS

See Heaters, Steam Jet, for Liquids

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Airaterra (Roylyn Products), Glendale, Calif.
American Sanitary Mfg. Co., Abingdon, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Ken-Ray Brass Products, Inc., Vermont, Ill.
King Union Co., Inc., Hillsgrove, R. I.
Leavitt Machine Co., Orange, Mass.

Moran Flexible Joint Co., Div. of Railroad Products Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
New York Brass Foundry, New York, N. Y.
Nibco, Inc., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Rhode Island Fittings Co., Providence, R. I.
Span Brass Mfg. Co., Otsego, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Union Metal Works Co., Inc., Chelsea, Mass.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.

UNIONS, INSULATING

See Joints, Pipe, Electrical Insulating

UNIONS, MALLEABLE, BRASS SEAT

Airaterra (Roylyn Products), Glendale, Calif.
Almar Hydraulic Valve Co., Cleveland, O.
Beaton & Corbin Mfg. Co., Southington, Conn.
Corley Co., Inc., The, New York, N. Y.
Crane Co., Chicago, Ill.
Das Div. of The Zeller Corp., Defiance, O.
Fairbanks Co., The, New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., East Greenwich, R. I.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jefferson Union Co., Lexington, Mass.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Rhode Island Fittings Co., Providence, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Stockham Valves & Fittings, Birmingham, Ala.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

UNIONS, ORIFICE

Catawissa Valve & Fittings Co., Catawissa, Pa.
Clayton Mark & Co., Evanston, Ill.
Dahl, G. W., Bristol, R. I.
Foxboro Co., Foxboro, Mass.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.

UNIONS, PLASTIC

Sloane Mfg. Co., Sun Valley, Calif.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
Tube Turns Plastics, Inc., Louisville, Ky.
Vanton Pump & Equipment Corp., Hillside, N. J.

UNIONS, STEEL

Afco Fitting Co., Div. of Curtis Mfg. Co., Cleveland, O.
Anchor Coupling Co., Inc., Libertyville, Ill.
Capitol Mfg. & Supply Co., Columbus, O.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chiksan Co., Brea, Calif.
Clayton Mark & Co., Evanston, Ill.
Crane Co., Chicago, Ill.
Das Div. of The Zeller Corp., Defiance, O.
Electric Steel Foundry Co., Portland, Ore.
Frick Co., Waynesboro, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Gray Tool Co., Houston, Tex.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Henry Valve Co., Melrose Park, Ill.
Ladish Co., Cudahy, Wis.
Porter Co., Inc., H. K., W-S Fittings Div., Roselle, N. J.
Rockwood Sprinkler Co., Worcester, Mass.
Steel Improvement & Forge Co., The, Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, FOR AUTOMOBILES

A.R.A. Mfg. Co., Ft. Worth, Texas
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Frigidaire Div., General Motors Corp., Dayton, O.
Frigikar Corp., Dallas, Tex.
Great Northern Mfg. Corp., Chicago, Ill.
Harrison Radiator Div., General Motors, Lockport, N. Y.
Keco Industries, Inc., Cincinnati, O.
Kool-Kar Co., Inc., Detroit, Mich.
Mitchell Co., John E., Dallas, Tex.
Thermador Electrical Mfg., Los Angeles, Calif.

UNITS, AIR CONDITIONING, BUS, TRUCK AND TRAILER

A.R.A. Mfg. Co., Ft. Worth, Texas.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Ellis & Watts Products Inc., Cincinnati, O.
Frigikar Corp., Dallas, Tex.
Keco Industries, Inc., Cincinnati, O.
McGraw-Edison Co., Clark Div., Chicago, Ill.
Metal Products Eng., Inc., Los Angeles, Calif. (Truck only)
Onan & Sons Inc., D. W., Minneapolis, Minn.
Thermo King Corp., Minneapolis, Minn.
Trane Co., The, La Crosse, Wis.
Waukesha Motor Co., Waukesha, Wis.

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

Acme Industries, Inc., Jackson, Mich.
Addison Products Co., Addison, Mich.
Air & Refrigeration Corp., New York, N. Y.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Airtron Corp., Holland, O.
Alco Refrigeration Sales & Service, Inc., Cleveland, O.
Alton Mfg. Co., Dallas, Tex.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Coils Co., Farmingdale, N. J.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Inc., Detroit, Mich.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Anetsberger Bros., Inc., Div. of Union Electric Corp., Northbrook, Ill.
Arkla Air Conditioning Corp., Evansville, Ind. (absorption type)
Bahnson Co., Winston-Salem, N. C.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blazer & Son, M., Passaic, N. J.
Bohn Aluminum & Brass Corp., Betz Div., Danville, Ill.
Brunner Div. of Dunham-Bush, Inc., Utica, N. Y.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Coleman Co., Inc., The, Wichita, Kans.
Cool-Ette, Inc., Detroit, Mich.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Deering Air Conditioning Co., The, Cincinnati, O.
Domestic Mfg. Corp., Houston, Tex.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Drying Systems Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Ellis & Watts Products, Inc., Cincinnati, O.
Friedrich Refrigerators, Inc., San Antonio, Tex.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Inc., Russell R., The, Cincinnati.
General Air Conditioning Corp., Los Angeles, Calif.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
General Electric Co., Commercial & Industrial Air Conditioning Dept., Bloomfield, N. J.
Gilbert & Barker Mfg. Co., West Spring, Mass.
Governair Corp., Oklahoma City, Okla.
Hastings Air Control, Inc., Omaha, Nebr.
Howe Ice Machine Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Keco Industries, Inc., Cincinnati, O.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Midwest Air Conditioning Co., Des Moines, Ia.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Payne Company, La Puente, Calif.
Recold Corp., Los Angeles, Calif.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Surface Combustion Corp., Toledo, O.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., Milwaukee, Wis.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, EXCLUSIVELY FOR HOSPITAL OPERATING ROOMS, WITH EXPLOSIONPROOF MOTOR

Conditioned Air, Inc., Charleston, W. Va.
Marlo Coil Co., St. Louis, Mo.
Niagara Blower Co., New York, N. Y.
Trane Co., **The, La Crosse, Wis.**
Worthington Corp., East Orange, N. J.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space conditioned, for connection to remote compressor or cold water supply, and steam or hot water

Air Conditioning Engineering Co., Cambridge, Mass.
Air & Refrigeration Corp., New York, N. Y.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Airtron Corp., Holland, O.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Coils Co., Farmingdale, N. J.
American Thermal Industries, Inc., Detroit, Mich.

Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Bahnson Co., Winston-Salem, N. C.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Besser Furnace and Air Conditioning Corp., Charlotte, N. C.
Blazer & Son, M., Passaic, N. J.
Bohn Aluminum & Brass Corp., Betz Div., Danville, Ill.
Brown Products Corp., Union, N. J.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Clime-Matic Corp., South Norwalk, Conn.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Drying Systems Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Inc., Russell R., The, Cincinnati, O.
General Electric Co., Air Conditioning Div., Bloomfield, N. J. (ceiling mounted)
General Electric Co., Commercial & Industrial Air Conditioning Dept., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Hastings Air Control, Inc., Omaha, Nebr.
International Mfg. Co., Oklahoma City, Okla.
Iron Fireman Mfg. Co., Cleveland, O.
Kennard Corp., St. Louis, Mo.
King Co. of Owatonna, The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lennox Industries Inc., The, Marshalltown, Ia.
Marlo Coil Co., St. Louis, Mo.
McGraw-Edison Co., Lonergan Coolerator Div., Albion, Mich.
McQuay, Inc., Minneapolis, Minn.
Midwest Air Conditioning Co., Des Moines, Ia.
Modine Mfg. Co., Racine, Wis.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Payne Company, La Puente, Calif.
Recold Corp., Los Angeles, Calif.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Williamson Co., Cincinnati, O.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co.,. Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

Air & Refrigeration Corp., New York, N. Y.
Airtron Corp., Holland, O.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Inc., Detroit, Mich.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C.
Bal-Air, Inc., Nashville, Tenn.
Bishop & Babock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Drying Systems Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Inc., Russell R., The, Cincinnati, O.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
General Electric Co., Commercial & Industrial Air Conditioning Dept., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Haertel Co., Walter, Minneapolis, Minn.
Howe Ice Machine Co., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
King Co. of Owatonna, The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lintern Corp., Painesville, O.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Midwest Air Conditioning Co., Des Moines, Ia.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Recold Corp., Los Angeles, Calif.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Simplaire, New York, N. Y.
Surface Combustion Corp., Toledo, O.
Thermal Engineering Corp., Houston, Tex.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Worthington Corp., East Orange, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE

Acme Industries, Inc., Jackson, Mich.
American Coils Co., Farmingdale, N. J.
Brunner Div. of Dunham-Bush, Inc., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Drying Systems Co., Chicago, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Buffalo, N. Y.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
General Electric Co., Commercial & Industrial Air Conditioning Dept., Bloomfield, N. J.
Marlo Coil Co., St. Louis, Mo.
McMillan Comfortaire, Inc., Jacksonville, Fla.
Mitchell Mfg. Co., Chicago, Ill.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Typhoon Heat Pump Co., Div. of Hupp Corp., Tampa, Fla.
Weather King of Florida, Inc., Orlando, Fla.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling by evaporation, no dehumidification

Air-Cooling Engineering Co., Evanston, Ill.
Air Equipment Co., Denver, Colo.
Airfan Engineering Co., Los Angeles, Calif.
Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Barwick Mfg. Corp., Wichita, Kan.
Buensod-Stacey, Inc., New York, N. Y.
Campbell Co., E. K., Kansas City, Mo.
Carrier Corp., Syracuse, N. Y.
Comfort Products Inc., Dallas, Tex.
Dearborn Stove Co., Dallas, Tex.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Essick Mfg. Co., Los Angeles, Calif.
Farr Co., Los Angeles, Calif.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Heating Assurance, Inc., Spokane, Wash.
International Metal Products Co., Phoenix.
Kleer Kleen Mfg. Co., Hayward, Calif.
Lennox Industries, Inc., Marshalltown, Ia.
Magic Aire Div., United Electric Co., Wichita Falls, Tex.
Marlo Coil Co., St. Louis, Mo.
Martin Fan & Blower Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif. (as pen fiber replacement mats)
Mountain States Equipment Co., Denver.
National Engineering & Mfg. Co., Sedalia, Mo.
National Gas Equipment Co., Inc., Denison, Tex.
Palmer Mfg. Co., Phoenix, Ariz.
R. I. Humidifier & Ventilating Co., Inc., Cambridge, Mass.
Thermador Electrical Mfg., Los Angeles, Calif.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Wright Mfg. Co., Phoenix, Ariz.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 36,000 BTU PER HR CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

Acme Industries, Inc., Jackson, Mich.
Air Conditioning Engineering Co., Cambridge, Mass.
Air-temp Construction, Div. of Chrysler Corp., Dayton, O.
Airtron Corp., Holland, O.
Bal-Air, Inc., Nashville, Tenn.
Blazer & Son, M., Passaic, N. J.
Brown Products Corp., Union, N. J.
Carlen Associates, New York, N. Y.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Clime-Matic Corp., South Norwalk, Conn.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hastings Air Control, Inc., Omaha, Neb.
Hydrotherm, Inc., Northvale, N. J.
International Mfg. Co., Oklahoma City, Okla.
Kennard Corp., St. Louis, Mo.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Lennox Industries, Inc., Marshalltown, Ia.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Mitchell Mfg. Co., Chicago, Ill.

Modine Mfg. Co., Racine, Wis.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
Round Oak Co., Inc., Dowagiac, Mich.
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Tenney Engineering, Inc., Union, N. J.
ThermoRay Corp., Newark, N. J.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Whitehall Engineering Co., Inc., Chicago, Ill.
Williamson Co., Cincinnati, O.
Worthington Corp., East Orange, N. J.
Wright Mfg. Co., Phoenix, Ariz.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 36,000 BTU PER HR CAPACITY

Self contained blower, coil, compressor, filter unit

Air Conditioning Engineering Co., Cambridge, Mass.
Airtron Corp., Holland, O.
Ajax Corp. of America, Evansville, Ind.
American Furnace Co., St. Louis, Mo.
Automatic Corp., St. Louis, Mo.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clime-Matic Corp., South Norwalk, Conn.
Cool-Ette, Inc., Detroit, Mich.
Delta Heating Corp., Trenton, N. J.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fedders-Quigan Corp., Buffalo, N. Y.
General Air Conditioning Corp., Los Angeles.
Great Northern Mfg. Corp., Chicago, Ill.
Hotpoint Co., Chicago, Ill.
Ingersoll Conditioned Air Div., Borg-Warner Corp., Kalamazoo, Mich.
Mitchell Mfg. Co., Chicago, Ill.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Philco Corp., Philadelphia, Pa.
Primor Products, Div. Borg-Warner Corp., Adrian, Mich.
Radio Corp. of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Rinehart Inc., Richmond, Ind.
Round Oak Co., Inc., Dowagiac, Mich.
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Surface Combustion Corp., Toledo, O.
Sutton Corp., O. A., The, Wichita, Kan.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
Viking Mfg. Corp., Cleveland, O.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 36,000 BTU PER HR CAPACITY AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft above floor

Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Airtron Corp., Holland, O.
American Blower Corp., Detroit, Mich.
American Coils Co., Farmingdale, N. J.
American Furnace Co., St. Louis, Mo.
American Standard, Air Conditioning Div., New York, N. Y.
American Thermal Industries, Inc., Detroit, Mich.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Armstrong Furnace Co., Div. of National Union Electric Corp., Columbus, O.
Automatic Corp., St. Louis, Mo.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Brunner Div. of Dunham-Bush, Inc., Utica, N. Y.
Bryant, Div. of Carrier Corp., Indianapolis, Ind.
Carrier Corp., Syracuse, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clime-Matic Corp., South Norwalk, Conn.
Conditioned Air, Inc., Charleston, W. Va.
Cool-Ette, Inc., Detroit, Mich.
Crane Co., Chicago, Ill.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Delta Heating Corp., Trenton, N. J.
Frick Co., Waynesboro, Pa.
Friedrich Refrigerators, Inc., San Antonio, Tex.
Frigid, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Automatic Products Corp., Baltimore, Md.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
General Electric Co., Commercial & Industrial Air Conditioning Dept., Bloomfield, N. J.
Gibson Refrigerator Co., Greenville, Mich.
Governair Corp., Oklahoma City, Okla.
Great Northern Mfg. Corp., Chicago, Ill.
Hastings Air Control, Inc., Omaha, Nebr.
Ingersoll Conditioned Air Div., Borg-Warner Corp., Kalamazoo, Mich.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., New York, N. Y.
Koch Refrigerators, Inc., Kansas City, Kans.
Lennox Industries Inc., The, Marshalltown, Ia.
Melchior, Armstrong, Dessau Co. of Delaware, Inc., Ridgefield, N. J.
Midwest Air Conditioning Co., Des Moines, Ia.
Mitchell Mfg. Co., Chicago, Ill.
Muncie Gear Wks., Inc., Muncie, Ind.
National-U. S. Radiator Corp., Johnstown, Pa.
Philco Corp., Philadelphia, Pa.
Primor Products, Div. Borg-Warner Corp., Adrian, Mich.
Round Oak Co., Inc., Dowagiac, Mich.
Surface Combustion Corp., Toledo, O.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Whitehall Engineering Co., Inc., Chicago, Ill.
Williams Div., Eureka Williams Corp., Bloomington, Ill.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, WALL TYPE, SELF-CONTAINED, FOR MOUNTING THROUGH WALL ONLY

Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Amic Mfg. Corp., Long Island City, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Coleman Co., Inc., The, Wichita, Kans.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.
I. W. Air Conditioning Corp., New York, N. Y.
Kelvinator Div., American Motors Corp., Detroit, Mich.
Lewyt Air-Conditioner Corp., Brooklyn, N. Y.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Sutton Corp., O. A., The, Wichita, Kans.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Webster & Co., Warren, Camden, N. J.
Worthington Corp., East Orange, N. J.

UNITS, AIR CONDITIONING, WINDOW, FOR CASEMENT WINDOWS

Admiral Corp., Chicago, Ill.
Amana Refrigeration, Inc., Amana, Ia.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O. (with provision for heating)
Deering Air Conditioning Co., The, Cincinnati, O.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.
Hunter Div., Robbins & Myers, Inc., Memphis, Tenn.
Kelvinator Div., American Motors Corp., Detroit, Mich.
Mitchell Mfg. Co., Chicago, Ill.
Perfection Industries Div., Hupp Corp., Cleveland, O.
Philco Corp., Philadelphia, Pa. (Heating element available)
Sutton Corp., O. A., The, Wichita, Ks.
Universal Major Electric Appliances, Inc., Baltimore, Md.
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.

UNITS, AIR CONDITIONING, WINDOW, FOR DOUBLE-HUNG WINDOWS

Addison Products Co., Addison, Mich.
Admiral Corp., Chicago, Ill.
Amana Refrigeration, Inc., Amana, Ia.
Automatic Corp., St. Louis, Mo.
Blissfield Mfg. Co., Blissfield, Mich.
Burnham Corp., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Cauhorn Distributing Co., Detroit, Mich.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O. (with provision for heating)
Deering Air Conditioning Co., The, Cincinnati, O.
Emerson Electric Mfg. Co., The, St. Louis, Mo. (reverse cycle)
Emerson-Quiet Kool Corp., Jersey City, N. J.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Company, Div. of Cory Corp., Chicago, Ill.
Friedrich Refrigerators, Inc., San Antonio, Tex.
Frigid, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.
Gibson Refrigerator Co., Greenville, Mich.

Great Northern Mfg. Corp., Chicago, Ill.
Hotpoint Co., Chicago, Ill. (with heating element)
Hunter Div., Robbins & Myers, Inc., Memphis, Tenn.
International Harvester Co., Chicago, Ill.
Kelvinator Div., American Motors Corp., Detroit, Mich.
King Refrigerator Co., Glendale, N. Y.
Lewyt Air-Conditioner Corp., Brooklyn, N. Y.
Mathes Co., The, Ft. Worth, Tex.
McGraw-Edison Co., Lonergan Coolerator Div., Albion, Mich.
Mitchell Mfg. Co., Chicago, Ill.
National Engineering & Mfg. Co., Sedalia, Mo.
Perfection Industries Div., Hupp Corp., Cleveland, O.
Philco Corp., Philadelphia, Pa. (heating element available)
Radio Corp. of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Rheem Mfg. Co., Chicago, Ill.
Sub-Zero Freezer Co., Inc., Madison, Wis.
Sutton Corp., O. A., The, Wichita, Kan.
Universal Major Electric Appliances, Inc., Baltimore, Md.
Viking Mfg. Corp., Cleveland, O. (heating element optional)
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass. (with or without heating element)
Whirlpool Corp., St. Joseph, Mich.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

Air Conditioning Engineering Co., Cambridge.
Air & Refrigeration Corp., New York, N. Y.
Auburn Burner Co., Auburn, Ind.
Bal-Air, Inc., Nashvile, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Clarage Fan Co., Kalamazoo, Mich.
Dalzen Mfg. Co., St. Clair, Mich.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Johnson Co., S. T., Oakland, Calif.
Kehm Corp., The, Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Mitchell Mfg. Co., Chicago, Ill.
Modine Mfg. Co., Racine, Wis.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, FAN-COIL TYPE, FOR INSTALLATION WITH OR WITHOUT CABINET IN ROOM, OR IN CLOSET SPACE, OVER CORRIDOR, ETC.

Comprises Blower, Chilled Water Direct Expansion or Hot Water Coil, for Connection to Remote Compressor or Chilled Water Supply

Acme Industries, Inc., Jackson, Mich.
Air Conditioning Engineering Co., Cambridge.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Airtherm Mfg. Co., St. Louis, Mo.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Auburn Burner Co., Auburn, Ind.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Blazer & Son, M., Passaic, N. J.
Brown Products Corp., Union, N. J.
Burnham Corp., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Circle-Air Industries, Inc., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Deansteel Products Co., San Antonio, Texas.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dunham-Bush, Inc., West Hartford, Conn.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
International Mfg. Co., Oklahoma City, Okla.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Mitchell Mfg. Co., Chicago, Ill.
National-U. S. Radiator Corp., Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Payne Company, La Puente, Calif.
Peerless of America, Inc., Chicago, Ill.
Recold Corp., Los Angeles, Calif.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Temtrol, Inc., Okarche, Okla.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Viking Mfg. Corp., Cleveland, O.
Webster & Co., Warren, Camden, N. J.
Weil-McLain Co., Michigan City, Ind.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Witt Co., A. H., Los Angeles, Calif.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

Acme Industries, Inc., Jackson, Mich.
Air Conditioning Engineering Co., Cambridge, Mass.
Air & Refrigeration Corp., New York, N. Y.
Airtemp Construction, Div. of Chrysler Corp., Dayton, O.
Airtron Corp., Holland, O.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Coils Co., Farmingdale, N. J.
American Radiator & Standard Sanitary Corp., New York, N. Y.
Auburn Burner Co., Auburn, Ind.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Baseline Mfg. Corp. of Fla., St. Petersburg, Fla.
Blazer & Son, M., Passaic, N. J.
Brown Products Corp., Union, N. J.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circle Air Industries, Inc., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Clime-Matic Corp., Norwalk, Conn.
Curtis Mfg. Co., Refrigeration Div., St. Louis, Mo.
Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Dunham-Bush, Inc., West Hartford, Conn.
Ejay Baseboard Mfg. Co., Winsted, Conn.
Fedders-Quigan Corp., Heating Div., Trenton, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Inc., Russell R., The, Cincinnati.
Hastings Air Control, Inc., Omaha, Nebr.
Johnson Co., S. T., Oakland, Calif.
Kennard Corp., St. Louis, Mo.
Koch Refrigerators, Inc., Kansas City, Kans.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
National-U. S. Radiator Corp., Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Reco Div. of Schemenauer Mfg. Corp., Holland, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Rittling Corp., The, Buffalo, N. Y.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Div. of Hupp Corp., Brooklyn, N. Y.
Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Worthington Corp., East Orange, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self Contained Compressor, Blower, Filter, Cooling Coils and Heating Coils for Connection to Steam or Hot Water Supply

General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.
Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
Webster & Co., Warren, Camden, N. J.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET, INDUCTION

Self-Contained Cooling and Heating Coil, Filter, Etc. for Connection to High Pressure Primary Air Supply, Cold Water Supply, and Hot Water Supply

American Blower Corp., Detroit, Mich.
Barkow Mfg. Co., Inc., Aug. C., Milwaukee.
Carrier Corp., Syracuse, N. Y.
Deering Air Conditioning Co., The, Cincinnati, O.
Nesbitt, Inc., John J., Philadelphia, Pa.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Worthington Corp., East Orange, N. J.

UNITS, CONDENSATE DISPOSAL, FOR AIR CONDITIONING

See Pumps, Condensate, For Removing Condensation from Air Conditioning Units

UNITS, EXHAUSTER, CENTRIFUGAL FAN

Airfan Engineering Co., Los Angeles, Calif.
Barry Blower Co., Minneapolis, Minn.
Brundage Co., The, Kalamazoo, Mich.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Clarage Fan Co., Kalamazoo, Mich.
Nesbitt Co., John J., Philadelphia, Pa.
Power Engineering Corp., Weirton, W. Va.
Robinson Ventilating Co., Zelienople, Pa.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING

Ace Engineering Co., Chicago, Ill.
Alco Products, Inc., Schenectady, N. Y.
Barclay, Inc., Robert, Chicago, Ill.
Canton Stoker Corp., Canton, O.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.

Drying Systems Co., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Engineer Co., New York, N. Y.
Faber Engineer Co., Inc., Philadelphia, Pa.
Hauck Mfg. Co., Brooklyn, N. Y.
Hite Mfg. Co., N. E., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Northern Ordnance Inc., Subsidiary of Northern Pump Co., Minneapolis, Minn.
Peabody Engineering Corp., New York, N. Y.
Petro, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Schurs Oil Burner Co., Los Angeles, Calif.
Staples & Pfeiffer, San Francisco, Calif.
Todd Shipyards Corp., Products Div., Brooklyn, N. Y.
Tuthill Pump Co., Chicago, Ill.
Warner Lewis Co., Div. of Fram Corp., Tulsa, Okla.
Webster Electric Co., Racine, Wis.
Wiegand Co., Edwin L., Pittsburgh, Pa. (electric)
Wilson Engineering Corp., Chicago, Ill.

UNITS, HEAT RECOVERY, AIR-TO-AIR

Therm-O-Wheel, Inc., Far Rockaway, N. Y.

UNITS, HEATING AND VENTILATING, HORIZONTAL PACKAGE TYPE

Campbell Co., E. K., Kansas City, Mo.
Chicago Steel Furnace Co., Chicago, Ill.
Clarage Fan Co., Kalamazoo, Mich.
McQuay, Inc., Minneapolis, Minn.
Nesbitt Co., John J., Philadelphia, Pa.

UNITS, MIXING, SOUND AND VOLUME CONTROL, FOR DOUBLE DUCT HIGH VELOCITY AIR CONDITIONING SYSTEM

Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Buensod-Stacey, Inc., New York, N. Y.
Connor Engineering Corp., Danbury, Conn.
Thermotank, Inc., Products Div., Detroit, Mich.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.

UNITS, STERILIZING, AIR

Air Purification Service, Inc., New York, N. Y.
Barnebey-Cheney Co., Columbus, O. (with activated charcoal)
Cooper Hewitt Electric Co., Div. of Sperti Faraday, Inc., Hoboken, N. J.
Dryomatic Corp., Alexandria, Va.
Germatrol Corp., Pittsburgh, Pa.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Kewaunee Mfg. Co., Adrian, Mich.
Sampson Scientific Co., Div. of the Sampson Chemical & Pigment Corp., Chicago, Ill.
Sperti Faraday, Inc., Hoboken, N. J.

UNITS, STERILIZING, WATER

Hanovia Chemical & Mfg. Co., Newark, N. J.

UNITS, WINDOW VENTILATOR AND FILTER

Airgard Mfg. Co., Chicago, Ill.
Air-Net Appliance Corp., Chicago, Ill. (with heating unit)
Colt Ventilation Co. of America, Inc., Los Angeles, Calif.
Goodwill Mfg. Co., Chicago, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Meir Electric & Machine Co., Inc., Indianapolis, Ind.
Reed Unit-Fans, Inc., New Orleans, La.
Standard Electric Mfg. Co., West Berlin, N. J.
Utility Appliance Corp., Los Angeles, Calif.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM CLEANING SYSTEMS, FITTINGS FOR

See Fittings for Central Vacuum Cleaning Systems

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, AIR OPERATING

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Airmatic Valve, Inc., Cleveland, O.
American Moistening Co., Providence, R. I.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Florham Park, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barksdale Valves, Los Angeles, Calif.
Binks Mfg. Co., Chicago, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Dahl, G. W., Bristol, R. I.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
De Zurik Corp., Sartell, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edward Valves, Inc., East Chicago, Ind.
Farris Flexible Valve Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gardner-Denver Co., Quincy, Ill.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Hammel-Dahl Co., Providence, R. I.
Hanna Engineering Wks., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloys)
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Ledeen Mfg. Co., El Monte, Calif.
Leslie Co., Lyndhurst, N. J.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Norwalk Valve Co., South Norwalk, Conn.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., The, Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.
Republic Mfg. Co., Cleveland, O.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Rockwood Sprinkler Co., Worcester, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Smith Co., S. Morgan, York, Pa.
Squires Co., C. E., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
U. S. Valve & Mfg. Co., S. San Francisco.
Uniflow Valve Corp., Cranford, N. J.
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.
Wedgeplug Valve Co., Div. of Stockham Valves & Fittings, Birmingham, Ala.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Westinghouse Air Brake Co., Industrial Products Div., Wilmerding, Pa.
Wilson Engineering Corp., Chicago, Ill.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, ALTITUDE

Cla-Val Co., Newport Beach, Calif.
De Zurik Corp., Sartell, Minn.
Foster Engineering Co., Union, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. Y.

VALVES, ANGLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
Anderson Brass Co., Detroit, Mich.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
Carpenter Valve Corp., The, Cleveland, O.
California Brass Mfg. Co., Los Angeles, Calif.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cla-Val Co., Newport Beach, Calif.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Deutsch Co., The, Los Angeles, Calif.
De Zurik Corp., Sartell, Minn.
Duriron Co., The, Dayton, O. (acid resisting)
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Frick Co., Waynesboro, Pa.
Gas Machinery Co., Cleveland, O.
General Ceramics Corp., Keasbey, N. J. (porcelain; plastic, alumina)
Grinnell Co., Inc., Providence, R. I.
Grove Valve and Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Haveg Industries, Inc., Newark, Del. (plastic and plastic body)
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.

VALVES, BOILER, NON-RETURN

Jenkins Bros., New York, N. Y.

Ohio Brass Co., Mansfield, O.

Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Leslie Co., Lyndhurst, N. J.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard Rubber)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Pittsburgh Valve Co., Reedsville, W. Va.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Mariemont, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Squires Co., C. E., The, Cleveland, O.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Uniflow Valve Corp., Cranford, N. J.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanton Pump & Equipment Corp., Hillside, N. J. (plastic)
Velan Valve Corp., Plattsburgh, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, AUTOMATIC SHUTOFF WITH MANUAL RESET

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
Baso, Inc., Milwaukee, Wis.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Newport Beach, Calif.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dahl, G. W., Bristol, R. I.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Maxon Premix Burner Co., Muncie, Ind.
McRae Specialty Co., Don, Glendale, Calif.
Norwalk Valve Co., South Norwalk, Conn.
P-K Industries, Inc., North Arlington, N. J.
Penn Controls, Inc., Goshen, Ind.
Rockwell Co., W. S., Fairfield, Conn.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Security Valves Corp., Glendale, Calif.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Thermac Co., Los Angeles, Calif.
Valco, Inc., Cincinnati, O.
Watts Regulator Co., Lawrence, Mass.

VALVES, AUTOMATIC, STOP AND CHECK

Crane Co., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Foster Engineering Co., Union, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
McAlear Mfg. Co., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Velan Valve Corp., Plattsburgh, N. Y.

VALVES, BACK PRESSURE

Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Charles M., San Francisco, Calif.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Newport Beach, Calif.
Cochrane Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Dahl, G. W., Bristol, R. I.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Granberg Corp., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hershey Mfg. Co., Dedham, Mass.
Hubbell Corp., Mundelein, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Josam Manufacturing Co., Michigan City, Ind.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Pokorney Mfg. Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schancke, Inc., Evansville, Ind.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Stickle Steam Specialties Co., Indianapolis, Ind.
Uniflow Valve Corp., Cranford, N. J.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

Bell & Gossett Co., Morton Grove, Ill.
Detroit Controls Corp., Detroit, Mich.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
G & H Mfg. Co., Philadelphia, Pa.
Hammond Brass Works, Hammond, Ind.
Hi-Flow Products, Inc., Copiague, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
Quality Specialty Co., Inc., Camden, N. J.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.

VALVES, BALL TYPE

Cardox Corp., Chicago, Ill.
Carpenter Sales Corp., Cleveland, O.
Carpenter Valve Corp., The, Cleveland, O.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Jamesbury Corp., Worcester, Mass.
Lunkenheimer Co., Cincinnati, O.
Multiplex Mfg. Co., Berwick, Pa.
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Rockwell Co., W. S., Fairfield, Conn.
Rockwood Sprinkler Co., Worcester, Mass.
Smith Co., S. Morgan, York, Pa.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, BAR STOCK

Associated Valve & Engineering Co., Chicago, Ill.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Autoclave Engineers Sales Corp., Erie, Pa.
Carpenter Sales Corp., Cleveland, O.
Carpenter Valve Mfg. Co., The, Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Circle Seal Products Co., Inc., Pasadena, Calif.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Deutsch Co., The, Los Angeles, Calif.
Farris Engineering Corp., Palisades Park, N. J.
Foxboro Co., Foxboro, Mass.
Greer Hydraulics, Inc., Jamaica, N. Y.
Grove Valve and Regulator Co., Oakland, Calif.
Guardian Products Corp., Michigan City, Ind.
Hammel-Dahl Co., Providence, R. I.
Jamesbury Corp., Worcester, Mass.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Shank Co., Cyrus, Chicago, Ill.
Star Stainless Screw Co., Paterson, N. J.
Uniflow Valve Corp., Cranford, N. J.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, BLOW-OFF

Bordo Co., Inc., L. J., Glenside, Pa.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Edward Valves, Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Gato Valve Co., Pittsburgh, Pa.
Henszey Co., Watertown, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jenkins Bros., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Madden Corp., The, Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Shank Co., Cyrus, Chicago, Ill.
Strong, Carlisle & Hammond, Cleveland, O.
Velan Valve Corp., Plattsburgh, N. Y.
Wilson Engineering Corp., Chicago, Ill.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES, BOILER, NON-RETURN

Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
McAlear Mfg. Co., Chicago, Ill.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.

VALVES, BRAZED END

Fairbanks Co., The, New York, N. Y.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hammond Brass Works, Hammond, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jenkins Bros., New York, N. Y.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve Co., Reedsville, W. Va.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

VALVES, BUTTERFLY

Airaterra (Roylyn Products), Glendale, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Continental Equipment Co., Div. of Fisher Governor Co., Coraopolis, Pa.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fabri-Valve Co. of America, Portland, Ore.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Gas Machinery Co., Cleveland, O.
General Ceramics Corp., Keasbey, N. J. (chemical stoneware, plastic)
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hauck Mfg. Co., Brooklyn, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Keystone Valve Corp., Houston, Tex.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y. (all iron for gas service)
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
Pratt Co., Henry, Chicago, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Smith Co., S. Morgan, York, Pa.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.
Worthington Corp., East Orange, N. J.

VALVES, BYPASS, WITH PROVISIONS FOR SOME CIRCULATION WHEN CLOSED

Dahl, G. W., Bristol, R. I.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Jenkins Bros., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Morrison Brothers Co., Dubuque, Ia.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Powell Co., Wm., The, Cincinnati, O.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Stockham Valves & Fittings, Birmingham, Ala.
Uniflow Valve Corp., Cranford, N. J.

VALVES, CHECK

Airaterra (Roylyn Products), Glendale, Calif.
Alloy Steel Products Co., Linden, N. J. (stainless steel)
American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Hard rubber)
Aminco Refrigeration Products, American Injector Co., Detroit, Mich. (Refrigeration)
Amp Corp., St. Louis, Mo.
Anderson Brass Co., Detroit, Mich.
Associated Valve & Engineering Corp., Chicago, Ill.
Autoclave Engineers Sales Corp., Erie, Pa.
Barrett Haentjens & Co., Hazelton, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Circle Seal Products Co., Inc., Pasadena, Calif.
Cla-Val Co., Newport Beach, Calif.
Clayton Mark & Co., Evanston, Ill.
Cochrane Corp., Philadelphia, Pa.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (plastic)
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Darling Valve & Mfg. Co., Williamsport, Pa.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Durabla Mfg. Co., New York, N. Y.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Fairbanks Co., The, New York, N. Y.
Foster Engineering Co., Union, N. J.
Gas Machinery Co., Cleveland, O.
General Ceramics Corp., Keasbey, N. J. (ceramics)
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Greer Hydraulics, Inc., Jamaica, N. Y.
Grinnell Co., Inc., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy only)
Hersey Mfg. Co., Dedham, Mass.
Imperial Brass Mfg. Co., Chicago, Ill.
Integral Corp., Hicksville, Long Island, N. Y.
Jenkins Bros., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Keystone Valve Corp., Houston, Tex.
LaBour Co., Inc., The, Elkhart, Ind.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Miller Valve Co., Inc., Pittsburgh, Pa. (Silent)
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Myers & Bro. Co., F. E., The, Ashland, O.
Norwalk Valve Co., South Norwalk, Conn.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Phillips & Co., H. A., Chicago, Ill.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Remco, Inc., Zelienople, Pa. (high pressure & low pressure)
Republic Mfg. Co., Cleveland, O.
Research Vacuum Supply Co., Chicago, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Schaible Co., The, Mariemont, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Sealol Corp., Providence, R. I.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Smith Co., S. Morgan, York, Pa.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Sullivan Valve & Engineering Co., Butte, Mont.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Tesco, Inc., Tulsa, Okla.
Universal Valve Co., Elizabeth, N. J.
Valves, Inc., F. G., Milwaukee, Wis.
Vanton Pump & Equipment Corp., Hillside, N. J. (plastic)
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.
Watkins Co., J. E., Maywood, Ill.
Watts Regulator Co., Lawrence, Mass.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.
Williams Gauge Co., Inc., The, Pittsburgh, Pa. (silent)

VALVES, CHECK, BRONZE

Airaterra (Roylyn Products), Glendale, Calif.
Anderson Brass Co., Detroit, Mich.
Barrett Haentjens & Co., Hazelton, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Circle Seal Products Co., Inc., Pasadena, Calif.
Cla-Val Co., Newport Beach, Calif.
Clayton Mark & Co., Evanston, Ill.
Crane Co., Chicago, Ill.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fairbanks Co., The, New York, N. Y.
Foster Engineering Co., Union, N. J.
Grinnell Co., Inc., Providence, R. I.
Grove Valve & Regulator Co., Oakland, Calif.
Hammond Brass Wks., Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Valve Co., Dunkirk, N. Y.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Miller Valve Co., Inc., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Morse-Smith-Morse Co., The, Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Myers & Bro. Co., F. E., The, Ashland, O.
Nibco, Inc., Elkhart, Ind.
Norwalk Valve Co., South Norwalk, Conn.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve Co., Reedsville, W. Va.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Rockford Brass Works, Rockford, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Schaible Co., The, Mariemont, O.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Sealol Corp., Providence, R. I.

Sims Pump Valve Co., Hoboken, N. J.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Tesco, Inc., Tulsa, Okla.
Valves, Inc., F. G., Milwaukee, Wis.
Walworth Co., New York, N. Y.
Watts Regulator Co., Lawrence, Mass.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Gauge Co., Inc., Pittsburgh, Pa.

VALVES, CHECK, IRON

Airaterra (Roylyn Products), Glendale, Calif.
Barrett Haentjens & Co., Hazelton, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Cla-Val Co., Newport Beach, Calif.
Clayton Mark & Co., Evanston, Ill.
Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Grove Valve & Regulator Co., Oakland, Calif.
Henry Valve Co., Melrose Park, Ill.
Jenkins Bros., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
M & H Valve & Fittings Co., Div. of Walworth Co., Anniston, Ala.
McDonald Mfg. Co., A.Y., Dubuque, Ia.
Miller Valve Co., Inc., Pittsburgh, Pa.
Mueller Co., Decatur, Ill.
Norwalk Valve Co., South Norwalk, Conn.
OPW Corp., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Phillips & Co., H. A., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Reading, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Saran Lined Pipe Co., Ferndale, Mich. (saran lined)
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Sealol Corp., Providence, R. I.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Tesco, Inc., Tulsa, Okla.
Valves, Inc., F. G., Milwaukee, Wis.
Walworth Co., New York, N. Y.
Williams Gauge Co., Inc., The, Pittsburgh, Pa.

VALVES, CHECK, STEEL

Airaterra (Roylyn Products), Glendale, Calif.
Associated Valve & Engineering Co., Chicago.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Circle Seal Products Co., Inc., Pasadena, Calif.
Cla-Val Co., Newport Beach, Calif.
Clayton Mark & Co., Evanston, Ill.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Foster Engineering Co., Union, N. J.
Greer Hydraulics, Inc., Jamaica, N. Y.
Grove Valve & Regulator Co., Oakland, Calif.
Jenkins Bros., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.
Miller Valve Co., Inc., Pittsburgh, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Saran Lined Pipe Co., Ferndale, Mich. (saran lined)
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Sealol Corp., Providence, R. I.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Tesco, Inc., Tulsa, Okla.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Velan Valve Corp., Plattsburgh, N. Y.
Vernon Tool Co., Ltd., Alhambra, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watkins Co., J. E., Maywood, Ill.
Williams Gauge Co., Inc., The, Pittsburgh.

VALVES, COMPRESSOR

Binks Mfg. Co., Chicago, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pokorney Mfg. Co., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., The, Milwaukee, Wis.
Voss Co., J. H. H., Inc., New York, N. Y. (suction and discharge)
Williams Gauge Co., Inc., The, Pittsburgh, Pa.

VALVES, CYLINDER OPERATED

Airmatic Valve, Inc., Cleveland, O.
Associated Valve & Engineering Co., Chicago, Ill.
Automatic Switch Co., Florham Park, N. J.
Cardox Corp., Chicago, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Clow & Sons, Inc., James B., Chicago, Ill.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Corp., Sartell, Minn.
Everlasting Valve Co., Jersey City, N. J.
Fabri-Valve Co. of America, Portland, Ore.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hammel-Dahl Co., Providence, R. I.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Jamesbury Corp., Worcester, Mass.
Jenkins Bros., New York, N. Y.
Leslie Co., Lyndhurst, N. J.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Pratt Co., Henry, Chicago, Ill.
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Saran Lined Pipe Co., Ferndale, Mich. (saran lined)
Smith Co., S. Morgan, York, Pa.
Superior Valve & Fittings Co., Pittsburgh Pa.
Wedgeplug Valve Co., Div. of Stockham Valves & Fittings, Birmingham, Ala.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, DIAPHRAGM
(Diaphragm controller elements controls opening of valve)

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Florham Park, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black,Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fabri-Valve Co. of America, Portland, Ore.
Farris Engineering Corp., Palisades Park, N. J.
Farris Flexible Valve Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Hubbell Corp., Mundelein, Ill.
Johnson Service Co., Milwaukee, Wis.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
North American Mfg. Co., Cleveland, O.
Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
P-K Industries, Inc., North Arlington, N. J.
Parks-Cramer Co., Fitchburg, Mass. (plain and jacketed)
Paul Valve Corp., New York, N. Y.
Powers Regulator Co., Skokie, Ill.
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Saran Lined Pipe Co., Ferndale, Mich.
Sarco Co., Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Smith Co., S. Morgan, York, Pa.
Squires Co., C. E., The, Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Trerice Co., H. O., Detroit, Mich.
Uniflow Valve Corp., Cranford, N. J.
United States Rubber Co., New York, N. Y.
Valves, Inc., F. G., Milwaukee, Wis.
Warren Engineering Co., Broadway, N. J.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, DIAPHRAGM
(Diaphragm itself throttles or shuts off flow)

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Flow Control Corp., Houston, Tex.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Associated Valve & Engineering Co., Chicago, Ill.

Bailey Co., Chas. M., San Francisco, Calif.
Baso, Inc., Milwaukee, Wis.
Bristol Co., The, Waterbury, Conn.
Conoflow Corp., Subsidiary of Walworth Corp., Philadelphia, Pa.
Coppus Engineering Corp., Worcester, Mass.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Ceramics Corp., Keasbey, N. J. (chemical stoneware)
General Controls Co., Glendale, Calif.
Grinnell Co., Inc., Providence, R. I.
Grove Valve and Regulator Co., Oakland, Calif.
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Hunt & Son, Inc., C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Skokie, Ill.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
Norwalk Valve Co., South Norwalk, Conn.
Penn Instruments Div. of Burgess-Manning Co., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Sall Bros. Co., Rockford, Ill.
Saran Lined Pipe Co., Ferndale, Mich.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Security Valves Corp., Glendale, Calif.
Sullivan Valve & Engineering Co., Butte, Mont.
Trerice Co., H. O., Detroit, Mich.
Tube Turns Plastics, Inc., Louisville, Ky. (injection molded PVC)
Uniflow Valve Corp., Cranford, N. J.
United States Rubber Co., New York, N. Y.
Walworth Co., New York, N. Y. (plastic PVC diaphragm)
Warren Engineering Co., Broadway, N. J.
Weston Electrical Instruments Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
White-Rodgers Co., St. Louis, Mo.

VALVES, DIAPHRAGM (Diaphragm used as seal between body and bonnet)

Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Associated Valve & Engineering Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Cla-Val Co., Newport Beach, Calif.
Conoflow Corp., Subsidiary of Walworth Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Duriron Co., Inc., The, Dayton, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Goodrich Industrial Products Co., B. F., Akron, O.
Grinnell Co., Inc., Providence, R. I.
Hammel-Dahl Co., Providence, R. I.
Haveg Industries, Inc., Newark, Del.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Klipfel Valves, Inc., Hamilton, O.
Knight, Maurice A., Akron, O. (molded resin for acids)
Leslie Co., Lyndhurst, N. J.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Brass Co., Port Huron, Mich.
Norwalk Valve Co., South Norwalk, Conn.
Powell Co., Wm., The, Cincinnati, O.
Research Vacuum Supply Co., Chicago, Ill.
Richmond Foundry & Mfg. Co., Inc., The, Richmond, Va.
Rockwell Co., W. S., Fairfield, Conn.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Security Valves Corp., Glendale, Calif.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trane Co., The, La Crosse, Wis.
Uniflow Valve Corp., Cranford, N. J.
United States Rubber Co., New York, N. Y.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

Allen Mfg. Co., W. D., Chicago, Ill.
Coppus Engineering Corp., Worcester, Mass
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Davis Regulator Co., Chicago, Ill.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Grinnell Co., Inc., Providence, R. I.
Grove Valve and Regulator Co., Oakland, Calif.
Hersey Mfg. Co., Dedham, Mass.
Hodgman Mfg. Co., Inc., Taunton, Mass.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Skokie, Ill.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
M & H Valve & Fittings Co., Div. of Walworth Co., Anniston, Ala.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Security Valves Corp., Glendale, Calif.
Stockham Valves & Fittings, Birmingham, Ala.
Valco, Inc., Cincinnati, O.

VALVES, FLOAT

A-P Controls Div., Controls Co. of America, Milwaukee, Wis. (Oil)
Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Hard rubber)
American Moistening Co., Providence, R. I.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Boylston Steam Specialty Co., Chicago, Ill.
Cla-Val Co., Newport Beach, Calif.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Valve and Regulator Co., Oakland, Calif.
Hubbell Corp., Mundelein, Ill.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Keckley Co., O. C., Skokie, Ill.
Ken-Ray Brass Products, Inc., Vermont, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonald Mfg. Co., A.Y., Dubuque, Ia.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morey, Dan, Los Angeles, Calif. (for evaporative coolers and cooling towers)
Mueller Brass Co., Port Huron, Mich.
Multiplex Mfg. Co., Berwick, Pa.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Robert Mfg. Co., Los Angeles, Calif.
Rockwell Co., W. S., Fairfield, Conn.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Shade Valve Mfg. Co., Philadelphia, Pa.
Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scoville Mfg. Co., Waterville Div., Waterville, Conn.
Skuttle Mfg. Co., Milford, Mich.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Taco Heaters, Inc., Cranston, R. I.
TOT Towers, Inc., Houston, Tex.
Trerice Co., H. O., Detroit, Mich.
Valves, Inc., F. G., Milwaukee, Wis.
Vanton Pump & Engineering Corp., Hillside, N. J. (plastic)
Velan Valve Corp., Plattsburgh, N. Y.
Warren Engineering Co., Broadway, N. J.
Watts Regulator Co., Lawrence, Mass.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, FLOAT AND LEVER BALANCED

Atlas Valve Co., Newark, N. J.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Keckley Co., O. C., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

American Flow Control Corp., Houston, Tex.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Econo Products Company, Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Fischer & Porter Co., Hatboro, Pa.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jackes-Evans Mfg. Co., Controls Div., St. Louis, Mo.
Kates Co., W. A., Deerfield, Ill.
Kehm Corp., The, Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Metalmaster Corp., Newark, N. J.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
OPW Corp., Cincinnati, O.
Quality Specialty Co., Inc., Camden, N. J.
Rockwell Co., W. S., Fairfield, Conn.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Velan Valve Corp., Plattsburgh, N. Y.
Webster & Co., Warren, Camden, N. J.
White Flomatic Corp., Hoosick Falls, N. Y.

Carpenter Sales Corp., Cleveland, O.
Carpenter Valve Corp., The, Cleveland, O.

VALVES, GLOBE, STEEL

Cla-Val Co., Newport Beach, Calif.
Crane Co., Chicago, Ill.

VALVES, FLUSH, BOTTOM TANK

Cooper Alloy Corp., Hillside, N. J.
Luzerne Rubber Co., Trenton, N. J. (hard rubber)
Powell Co., Wm., The, Cincinnati, O.

VALVES, FORGED STEEL

Alco Products, Inc., Schenectady, N. Y.
American Meter Co., Inc., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Grove Valve and Regulator Co., Oakland, Calif.
Henry Valve Co., Melrose Park, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Smith Co., S. Morgan, York, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Valve & Fittings Co., Pittsburgh.
Taylor Instrument Companies, Rochester, N. Y.
Velan Valve Corp., Plattsburgh, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
Worcester Valve Co., Inc., Worcester, Mass.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES, GATE, ALLOY

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Fischer & Porter Co., Hatboro, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
New England Valve Corp., Worcester, Mass.
OPW Corp., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
Tru-Flo, Inc., Buffalo, N. Y.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, GATE, ALUMINUM

American Flow Control Corp., Houston, Tex.
Darling Valve & Mfg. Co., Williamsport, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
OPW Corp., Cincinnati, O.
Powell Co., Wm., The, Cincinnati, O.
Rockwell Co., W. S., Fairfield, Conn.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, GATE, BRASS AND BRONZE

American Brass Co., Waterbury, Conn.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Darling Valve Mfg. Co., Williamsport, Pa.
Detroit Controls Corp., Detroit, Mich.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Fischer & Porter Co., Hatboro, Pa.
Hammond Brass Wks., Hammond, Ind.
Jenkins Bros., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Marsh Valve Co., Dunkirk, N. Y.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia. (for oil handling)
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve Co., Reedsville, W. Va.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockford Brass Works, Rockford, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Schaible Co., The, Mariemont, O.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
Walworth Co., New York, N. Y.

VALVES, GATE, IRON BODY

Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Clow & Sons, Inc., James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Corp., Sartell, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Fischer & Porter Co., Hatboro, Pa.
Gas Machinery Co., Cleveland, O.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
M & H Valve & Fittings Co., Div. of Walworth Co., Anniston, Ala.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Mueller Co., Decatur, Ill.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
Valve Div. of ACF Industries, Detroit, Mich.
Walworth Co., New York, N. Y.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, GATE, MALLEABLE IRON

Crane Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
Rockwell Co., W. S., Fairfield, Conn.

VALVES, GATE, STEEL

Alco Products, Inc., Schenectady, N. Y.
Allegheny Valve Co., Warren, Pa.
Allmetal Screw Products Co., Inc., Garden City, Long Island, N. Y.
Cameron Iron Works, Inc., Houston, Tex.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Corp., Sartell, Minn.
Edward Valves, Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Fabri-Valve Co. of America, Portland, Ore.
Fischer & Porter Co., Hatboro, Pa.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Grove Valve and Regulator Co., Oakland, Calif.
Hamer Valves, Inc., Long Beach, Calif.
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
L. R. P. Corp., Liecester, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
W-K-M Mfg. Co., Div. of ACF Industries, Inc., Houston, Tex.
Walworth Co., New York, N. Y.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, GLOBE, ALLOY

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Associated Valve & Engineering Co., Chicago, Ill.
Carpenter Valve Corp., The, Cleveland, O.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Edward Valves, Inc., East Chicago, Ind.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville,, Tenn.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
Republic Mfg. Co., Cleveland, O.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Strahman Valves, Inc., New York, N. Y.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, GLOBE, ALUMINUM

Dahl, G. W., Bristol, R. I.
Hasco Valve & Machine Co., Milwaukee.
Powell Co., Wm., The, Cincinnati, O.
Republic Mfg. Co., Cleveland, O.

VALVES, GLOBE, BRASS AND BRONZE

American Brass Co., Waterbury, Conn.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
California Brass Mfg. Co., Los Angeles.

Carpenter Sales Corp., Cleveland, O.
Carpenter Valve Corp., The, Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Detroit Controls Corp., Detroit, Mich.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Fairbanks Co., The, New York, N. Y.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Grinnell Co., Inc., Providence, R. I.
Hammel-Dahl Co., Providence, R. I.
Hammond Brass Wks., Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve Co., Reedsville, W. Va.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Rockford Brass Works, Rockford, Ill.
Schaible Co., The, Mariemont, O.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh.
Taylor Instrument Companies, Rochester, N. Y.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, GLOBE, IRON BODY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Dersch, Gesswein & Neuert, Inc., Chicago.
Fairbanks Co., The, New York, N. Y.
Frick Co., Waynesboro, Pa.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Walworth Co., New York, N. Y.

VALVES, GLOBE, MALLEABLE IRON

Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Powell Co., Wm., The, Cincinnati, O.

VALVES, GLOBE, STEEL

Allmetal Screw Products Co., Inc., Garden City, Long Island, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
De Zurik Corp., Sartell, Minn.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Grove Valve and Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Richmond Foundry & Mfg. Co., Inc., The, Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Velan Valve Corp., Plattsburgh, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, INSTRUMENT

Airaterra (Roylyn Products), Glendale, Calif.
Associated Valve & Engineering Co., Chicago, Ill.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Autoclave Engineers Sales Corp., Erie, Pa.
Bailey Co., Charles M., San Francisco, Calif.
Bristol Co., The, Waterbury, Conn.
Carpenter Valve Corp., The, Cleveland, O.
Circle Seal Products Co., Inc., Pasadena, Calif.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Defender Instrument & Regulator Co., Boody, Ill.
Edward Valves, Inc., East Chicago, Ind.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Skokie, Ill.
Leslie Co., Lyndhurst, N. J.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Republic Mfg. Co., Cleveland, O.
Security Valves Corp., Glendale, Calif.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Trerice Co., H. O., Detroit, Mich.
Warren Engineering Co., Broadway, N. J.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, LINED

American Flow Control Corp., Houston, Tex.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J. (Rubber lined)
Cla-Val Co., Newport Beach, Calif.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Corp., Sartell, Minn.
Division Lead Co., Summit, Ill.
Fabri-Valve Co. of America, Portland, Ore.
Farris Flexible Valve Corp., Palisades Park, N. J.
Gates Engineering Co., Wilmington, Del.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Goodrich Industrial Products Co., B. F., Akron, O.
Grinnell Co., Inc., Providence, R. I.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Knapp Mills, Inc., Long Island City, N. Y.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
National Lead Co., New York, N. Y. (Lead)
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O. (plastic)
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Smith Co., S. Morgan, York, Pa.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
United States Rubber Co., New York, N. Y. (rubber lined, metal)

VALVES, LUBRICATED PLUG

Duriron Co., Inc., The, Dayton, O. (acid resisting)
Ohio Injector Co., Wadsworth, O.
Mueller Co., Decatur, Ill.
Powell Co., William, Cincinnati, O.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

Atkomatic Valve Co., Inc., Indianapolis, Ind.
Automatic Switch Co., Florham Park, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Dole Valve Co., The, Morton Grove, Ill.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
General Fittings Co., East Greenwich, R. I.
Hammel-Dahl Co., Providence, R. I.
Holby Tempering Valve Co., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Marsh Valve Co., Dunkirk, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
OPW Corp., Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
Radiant Utilities Corp., Brooklyn, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Strahman Valves, Inc., New York, N. Y.
Taco Heaters, Inc., Cranston, R. I.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Webster & Co., Warren, Camden, N. J.
Yula Water Heaters, Inc., Bronx, N. Y.

VALVES, MIXING, HOT AND COLD WATER, THERMOSTATIC

Controls Co. of America, Soreng Div., Schiller Park, Ill.

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Fittings Co., East Greenwich, R. I.
Holby Tempering Valve Co., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Lawler Automatic Controls, Inc., Mt. Vernon, N. Y.
Leonard Valve Co., Cranston, R. I.
Powers Regulating Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Taco Heaters, Inc., Cranston, R. I.
Trerice Co., H. O., Detroit, Mich.
Vic Mfg. Co., Minneapolis, Minn.
Warren Engineering Co., Broadway, N. J.
Watts Regulator Co., Lawrence, Mass.
Yula Water Heaters, Inc., Bronx, N. Y.

VALVES, MIXING, STEAM AND WATER

Hammel-Dahl Co., Providence, R. I.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
OPW Corp., Cincinnati, O.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Screw Machine Products Co., Portland, Ore.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Strahman Valves, Inc., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.

VALVES, MOTOR OPERATED

Alloy Steel Products Co., Linden, N. J. (stainless steel)
Associated Valve & Engineering Co., Chicago, Ill.
Au-Temp-Co Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Baso, Inc., Milwaukee, Wis.
Belco Industrial Equipment Div., Bogue Electrical Mfg. Co., Paterson, N. J.
Bell & Gossett Co., Morton Grove, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Clow & Sons, Inc., James B., Chicago, Ill.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dahl, G. W., Bristol, R. I. (air motor)
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
De Zurik Corp., Sartell, Minn.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Fischer & Porter Co., Hatboro, Pa.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy only)
Hauck Mfg. Co., Brooklyn, N. Y.
Heat-Timer Corp., New York, N. Y.
Hills-McCanna Co., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Skokie, Ill.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., The, Cincinnati, O.
Pratt Co., Henry, Chicago, Ill.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Refrigerating Specialties Co., Chicago, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Saran Lined Pipe Co., Ferndale, Mich.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Buck County, Pa.
Scientific Instrument Co., Detroit, Mich.
Smith Co., S. Morgan, York, Pa.
Squires Co., C. E., The, Cleveland, O.
Stockham Valves & Fittings, Birmingham, Ala.
Taylor Instrument Companies, Rochester, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Trerice Co., H. O., Detroit, Mich.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Warren Engineering Co., Broadway, N. J.
Webster & Co., Warren, Camden, N. J.
Wedgeplug Valve Co., Div. of Stockham Valves & Fittings, Birmingham, Ala.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, NEEDLE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Allin Mfg. Co., Inc., Chicago, Ill.
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Meter Co., Inc., Philadelphia, Pa.
Anderson Brass Co., Detroit, Mich.
Associated Valve & Engineering Co., Chicago, Ill.
Autoclave Engineers Sales Corp., Erie, Pa.
Binks Mfg. Co., Chicago, Ill.
Carpenter Valve Corp., The, Cleveland, O. (Stainless steel stem, brass bar stock body)
Carpenter Sales Corp., Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Commonwealth Brass Corp., Detroit, Mich.
Cooper Alloy Corp., Hillside, N. J.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Controls Corp., Detroit, Mich.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General-American Valve Co., Corona Del Mar, Calif.
Grove Valve and Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Maid-O'-Mist, Inc., Chicago, Ill.
Madden Brass Products Co., Aurora, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Modern Engineering Co., St. Louis, Mo.
Morrison Brothers Co., Dubuque, Ia. (for oil handling)
Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Englewood, Colo.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Research Vacuum Supply Co., Chicago, Ill.
Security Valves Corp., Glendale, Calif.
Shank Co., Cyrus, Chicago, Ill.
Spindler & Sons, Inc., August, Jersey City, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Torit Mfg. Co., St. Paul, Minn.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Velan Valve Corp., Plattsburgh, N. Y.
Walworth Co., New York, N. Y.
Watkins Co., J. E., Maywood, Ill.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, NON-RETURN

Autoclave Engineers Sales Co., Erie, Pa.
Crane Co., Chicago, Ill.
Foster Engineering Co., Union, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
Republic Mfg. Co., Cleveland, O.
Velan Valve Corp., Plattsburgh, N. Y.

VALVES, OXYGEN

Airaterra (Roylyn Products), Glendale, Calif.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Carpenter Valve Corp., The, Cleveland, O.
Cooper Alloy Corp., Hillside, N. J.
Dahl, G. W., Bristol, R. I.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Hammel-Dahl Co., Providence, R. I.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Jamesbury Corp., Worcester, Mass.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Modern Engineering Co., St. Louis, Mo.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Oxygen Equipment & Service Co., Chicago, Ill.
Research Vacuum Supply Co., Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Valco, Inc., Cincinnati, O.
Walworth Co., New York, N. Y.
Wedgeplug Valve Co., Div. of Stockham Valves & Fittings, Birmingham, Ala.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, PACKLESS

Associated Valve & Engineering Co., Chicago, Ill.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kinney Mfg. Div., The New York Air Brake Co., Boston, Mass. (vacuum)
Mercoid Corp., The, Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
Spence Engineering Co., Inc., Walden, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.

VALVES, PILOT OPERATED

American Flow Control Corp., Houston, Tex.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Florham Park, N. J.
Bailey Co., Charles M., San Francisco, Calif.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Clark Mfg. Co., Cleveland, O.
Cla-Val Co., Newport Beach, Calif.
Farris Flexible Valve Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hanna Engineering Works, Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hubbell Corp., Mundelein, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Security Valves Corp., Glendale, Calif.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, PLASTIC

Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Agile Corp., Bedford, O.
American Flow Control Corp., Houston, Tex.
American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Atlas Mineral Products Co., Mertztown, Pa.
Bolta Products, A Div. of General Tire & Rubber Co., Lawrence, Mass.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (Diaphragm Valves)
Dahl, G. W., Bristol, R. I.
Easton Plastic Products Co., Inc., Easton, Pa. (rigid, unplasticized polyvinyl chloride)
Goodrich Industrial Products Co., B. F., Akron, O. (rigid)
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O.
Hartwell & Son, Inc., H. N., Boston, Mass. (PVC)
Haveg Industries, Inc., Newark, Del.
Hills-McCanna Co., Chicago, Ill.
Industrial Plastic Fabricators, Inc., Norwood, Mass. (PVC)
Jamesbury Corp., Worcester, Mass.
LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Lunkenheimer Co., Cincinnati, O. (PVC)
Saran Lined Pipe Co., Ferndale, Mich, (saran)
Seelye Craftsmen, The, Minneapolis, Minn.
Skyline Industries Sales, Inc., Titusville, Pa.
Sloane Mfg. Co., Sun Valley, Calif.
Tube Turns Plastics Inc., Louisville, Ky. (PVC)
United States Rubber Co., New York, N. Y.
Vauton Pump & Equipment Corp., Hillside, N. J.
Walworth Co., New York, N. Y.

VALVES, PLUG

Alpha Plastics, Inc., Livingston, N. J. (PVC)
American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
Ampco Metal, Inc., Milwaukee, Wis.
Andale Co., Philadelphia, Pa.
Barrett Haentjens & Co., Hazleton, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Cameron Iron Works, Inc., Houston, Tex.
Circle Seal Products Co., Inc., Pasadena, Calif.
Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O. (plastic)
Clow & Sons, Inc., James B., Chicago, Ill.
Cooper Alloy Corp., Hillside, N. J.
Corning Glass Works, Corning, N. Y.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
De Zurik Corp., Sartell, Minn. (rubber faced)
Duriron Co., Inc., Dayton, O. (Acid resisting)
Faber Engineering Co., Inc., Philadelphia, Pa.
Fabri-Valve Co. of America, Portland, Ore.
Gato Valve Co., Pittsburgh, Pa.
General Ceramics Corp., Keasbey, N. J. (Chemical stoneware & porcelain)
Gilbert Brass Foundry Co., St. Louis, Mo.
Hamer Valves Inc., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloys)
Hays Mfg. Co., Erie, Pa.
Hetherington & Berner, Inc., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Knight, Maurice A., Akron, O. (Stoneware for acids)
Ladish Co., Tri-Clover Div., Kenosha, Wis.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
P-K Industries, Inc., North Arlington, N. J.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve Co., Reedsville, W. Va.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Republic Mfg. Co., Cleveland, O.
Reynolds Water Conditioning Co., Detroit, Mich.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Smith Co., S. Morgan, York, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Taylor Instrument Companies, Rochester, N. Y.
Texsteam Corp., Houston, Tex. (non-lubricated)
Thermac Co., Los Angeles, Calif.
Tube Turns Plastics, Inc., Louisville, Ky. (Injection molded PVC)
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Vanton Pump & Equipment Corp., Hillside, N. J. (plastic)
Vogt Machine Co., Henry, Louisville, Ky.
W-K-M Mfg. Co., Div. of ACF Industries, Inc., Houston, Tex.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Wedgeplug Valve Co., Div. of Stockham Valves & Fittings, Birmingham, Ala.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVE POSITION INDICATORS

See Indicators, Valve, Position

VALVES, PRESSURE REDUCING AND PRESSURE RELIEF, WATER

(Including Provisions for Emergency Boiler Feeding)

Airmatic Valve, Inc., Cleveland, O.
American Flow Control Corp., Houston, Tex.
Bell & Gossett Co., Morton Grove, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Defender Instrument & Regulator Co., Boody, Ill.
Fischer & Porter Co., Hatboro, Pa.
Hammel-Dahl Co., Providence, R. I.
Leslie Co., Lyndhurst, N. J.
Milton Roy Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Sall Bros. Co., Rockford, Ill.
Squires Co., C. E., The, Cleveland, O.
Trerice Co., H. O., Detroit, Mich.
Valves, Inc., F. G., Milwaukee, Wis.
Watts Regulator Co., Lawrence, Mass.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
American Car & Foundry Div. of ACF Industries, Inc., New York.
American Flow Control Corp., Houston, Tex.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Autoclave Engineers Sales Corp., Erie, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
CCA Products, Inc., Glendale, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Flexible Valve Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Valve and Regulator Co., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hanna Engineering Wks., Chicago, Ill.
Harris Calorific Co., The, Cleveland, O.
Hauck Mfg. Co., Brooklyn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Locke Regulator Co., Salem, Mass.

Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Maxitrol Co., Detroit, Mich.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Mueller Co., Decatur, Ill.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., South Norwalk, Conn.
OPW Corp., Cincinnati, O.
P-K Industries, Inc., North Arlington, N. J.
Powers Regulator Co., Skokie, Ill.
Refrigerating Specialties Co., Chicago, Ill.
Research Vacuum Supply Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Strong, Carlisle & Hammond, Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Universal Controls Corp., Dallas, Tex.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Airmatic Valve Inc., Cleveland, O.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
Cla-Val Co., Newport Beach, Calif.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange. N. J.
Dunham-Bush, Inc., West Hartford, Conn.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
OPW Corp., Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Valves, Inc., F. G., Milwaukee, Wis.
Vapor Heating Corp., Chicago, Ill.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, LIQUID

Clark Mfg. Co., Cleveland, O.
Cla-Val Co., Newport Beach, Calif.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Keckley Co., O. C., Skokie, Ill.
Klipfel Valves, Inc., Hamilton, O.
McAlear Mfg. Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Republic Flow Meters Co., Chicago, Ill.
Ross Valve & Mfg. Co., Inc., Troy, N. Y.
Simplex Valve & Meter Co., Lancaster, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Tryco Products, Inc., Westfield, Mass.
Watkins Co., J. E., Maywood, Ill.

VALVES, PRESSURE REDUCING AND REGULATING, STEAM

Aerco Corp., Northvale, N. J.
Airmatic Valve, Inc., Cleveland, O.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., Boody, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dunham-Bush, Inc., West Hartford, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Valve and Regulator Co., Oakland, Calif.
Hagan Chemicals & Controls, Inc., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hoffman Specialty Mfg. Corp., Indianapolis.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst; N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
OPW Corp., Cincinnati, O.
P-K Industries, Inc., North Arlington, N. J.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., The, Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

VALVES, PUMP

Anchor Packing Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cla-Val Co., Newport Beach, Calif.
Clayton Mark & Co., Evanston, Ill.
Coffin Co., Jr., J. S., Englewood, N. J.
Darcoid Co., Inc., New York, N. Y.
Defender Instrument & Regulator Co., Boody, Ill.
Durabla Mfg. Co., New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Garlock Packing Co., Palmyra, N. Y.
Goodrich Industrial Products Co., Akron, O.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Madden Corp., The, Chicago, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Myers & Bro. Co., F. E., The, Ashland, O.
New York Belting & Packing Co., Passaic, N. J.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Sims Pump Valve Co., Hoboken, N. J.
United States Rubber Company, New York, N. Y.
Valves, Inc., F. G., Milwaukee, Wis.
Watts Regulator Co., Lawrence, Mass.
Webster Electric Co., Racine, Wis.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Gauge Co., Inc., The, Pittsburgh, Pa.

VALVES, QUICK OPENING

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Flow Control Corp., Houston, Tex.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Barksdale Valves, Los Angeles, Calif.
Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Darling Valve & Mfg. Co., Williamsport, Pa.
Defender Instrument & Regulator Co., Boody, Ill.
Detroit Controls Div., American-Standard Corp., Stratford, Conn.
Dole Refrigerating Co., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Farris Flexible Valve Corp., Palisades Park, N. J.
Grinnell Co., Inc., Providence, R. I.
Hamer Valves, Inc., Long Beach, Calif.
Hammel-Dahl Co., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee. (alloy)
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jamesbury Corp., Worcester, Mass.
Jenkins Bros., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.

Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Lunkenheimer Co., Cincinnati, O.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
P-K Industries, Inc., North Arlington, N. J.
Paul Valve Corp., New York, N. Y.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.
Research Vacuum Supply Co., Chicago, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Walworth Co., New York, N. Y.
Worcester Valve Co., Inc., Worcester, Mass.

VALVES, RADIATOR, AIR, FOR HOT WATER RADIATORS

Anderson Products, Inc., Cambridge, Mass.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Dole Valve Co., The, Morton Grove, Ill.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
G & H Mfg. Co., Philadelphia, Pa.
Hammond Brass Wks., Hammond, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jenkins Bros., New York, N. Y.
Keeney Mfg. Co., Newington, Conn.
Little Brass Goods Co., M. S., Hartford, Conn.
Maid-O'Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
New York Air Valve Corp., Brooklyn, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Quality Specialty Co., Inc., Camden, N. J.
Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Sarco Co., Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.

VALVES, RADIATOR, AIR, FOR STEAM RADIATORS

Anderson Products, Inc., Cambridge, Mass.
Bridgeport Brass Co., Bridgeport, Conn.
Detroit Controls Corp., Detroit, Mich.
Dole Valve Co., The, Morton Grove, Ill.
Econo Products Co., Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Gorton Heating Co., Cranford, N. J.
Hammond Brass Wks., Hammond, Ind.
Heat-Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jenkins Bros., New York, N. Y.
Keeney Mfg. Co., Newington, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
New York Air Valve Corp., Brooklyn, N. Y.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
Sarco Co., Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Cranston, R. I.
Triplex Heating Specialty Co., Inc., Peru, Ind.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

Barber-Colman Co., Rockford, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Jenkins Bros., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarcotherm Controls, Inc., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PACKLESS

Barber-Colman Co., Rockford, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Heat Timer Corp., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarco Co., Inc., New York, N. Y.
Squires Co., C. E. The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Trane Co., The, LaCrosse, Wis.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED, PACKLESS

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.

VALVES, RADIATOR, ORIFICE

Barnes & Jones, Inc., Newtonville, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham-Bush, Inc., West Hartford, Conn.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Marsh Valve Co., Dunkirk, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Trane Co., The, LaCrosse, Wis.
Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

Barnes & Jones, Inc., Newtonville, Mass.
Cashin Co., W. D., Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Dunham-Bush, Inc., West Hartford, Conn.
Fairbanks Co., The, New York, N. Y.
Hammond Brass Wks., Hammond, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kritzer Radiant Coils, Inc., Batavia, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
Powell Co., Wm., The, Cincinnati, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Newtonville, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham-Bush, Inc., West Hartford, Conn.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jenkins Bros., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Ohio Brass Co., Mansfield, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Sterling Inc., Milwaukee, Wis.
Webster & Co., Warren, Camden, N. Y.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
General-American Valve Co., Corona Del Mar, Calif.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Hubbell Corp., Mundelein, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Marsh Instrument Co., Skokie, Ill.
Mueller Brass Co., Port Huron, Mich.
Okadee Co., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
Metrex Valve Co., Franklin Park, Ill.
Mueller Brass Co., Port Huron, Mich.
Refrigerating Specialties Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Cash Co., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mayson Mfg. Co., Detroit, Mich.
Metrex Valve Co., Franklin Park, Ill.
Refrigerating Specialties Co., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., The, Milwaukee, Wis.
Watkins Co., J. E., Maywood, Ill.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Detroit Controls Corp., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Mayson Mfg. Co., Detroit, Mich.
Metrex Valve Co., Franklin Park, Ill.
Ranco, Inc., Columbus, O.
Sporlan Valve Co., St. Louis, Mo.
Tenney Engineering, Inc., Union, N. J.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Armstrong Machine Works, Three Rivers, Mich.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Hubbell Corp., Mundelein, Ill.
Mercoid Corp., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Wabash Corp., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

Mayson Mfg. Co., Detroit, Mich.
Phillips & Co., H. A., Chicago, Ill.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

Alco Valve Co., St. Louis, Mo.
Defender Instrument & Regulator Co., Boody, Ill.
Frick Co., Waynesboro, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Magnetrol, Inc., Chicago, Ill.
Metrex Valve Co., Franklin Park, Ill.
Phillips & Co., H. A., Chicago, Ill.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

VALVES, REFRIGERATION, MAGNETIC STOP

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Automatic Switch Co., Florham Park, N. J.
Detroit Controls Corp, Detroit, Mich.
Frick Co., Waynesboro, Pa.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hubbell Corp., Mundelein, Ill.
Jackes-Evans Mfg. Co., Controls Div., St. Louis, Mo.
Marsh Refrigeration Equipment Co., Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Mercoid Corp., Chicago, Ill.
Metrex Valve Co., Franklin Park, Ill.
Penn Controls, Inc., Goshen, Ind.
Refrigerating Specialties Co., Chicago, Ill.
Sporlan Valve Co., St. Louis, Mo.
Watkins Co., J. E., Maywood, Ill.

VALVES, REFRIGERATION, TEMPERATURE REGULATING OR SNAP ACTION SUCTION

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
Hubbell Corp., Mundelein, Ill.
McCorkle Co., D. H., Berkeley, Calif.
Metrex Valve Co., Franklin Park, Ill.
Refrigerating Specialties Co., Chicago, Ill.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Watkins Co., J. E., Maywood, Ill.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products, American Injector Co., Detroit, Mich.
Art Valve Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
General Controls Co., Glendale, Calif.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kieley & Mueller, Inc., Middletown, N. Y.
Marsh Refrigeration Equipment Co., Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Mayson Mfg. Co., Detroit, Mich.
Mercoid Corp., Chicago, Ill.
Metrex Valve Co., Franklin Park, Ill.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Refrigerating Specialties Co., Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Spence Engineering Co., Inc., Walden, N. Y.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Dole Valve Co., The, Morton Grove, Ill.
Foster Engineering Co., Union, N. J.
Kunkle Valve Co., Ft. Wayne, Ind.
McDonnell & Miller, Inc., Chicago, Ill.
Mueller Co., Decatur, Ill.
New York Air Valve Corp., Brooklyn, N. Y.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Schaible Co., The, Mariemont, O.
Thrush & Co., H. A. Peru, Ind.
Trane Co., The, La Crosse, Wis.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cla-Val Co., Newport Beach, Calif.
Cochrane Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Davis Regulator Co., Chicago, Ill
Defender Instrument & Regulator Co., Boody, Ill.
Dole Valve Co., The, Morton Grove, Ill.
Dunham-Bush, Inc., West Hartford, Conn.
Durabla Mfg. Co., New York, N. Y.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Keckley Co., O. C., Skokie, Ill.
Kehm Corp., The, Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McAlear Mfg. Co., Chicago, Ill.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
McDonnell & Miller, Inc., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
Multiplex Mfg. Co., Berwick, Pa.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Taco Heaters, Inc., Cranston, R. I.
Texsteam Corp., Houston, Tex.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.
Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Mueller Co., Decatur, Ill.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Cranston, R. I.
Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

VALVES, RELIEF, HYDRAULIC

Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Charles M., San Francisco, Calif.
Blackhawk Mfg. Co., Milwaukee, Wis.
Cameron Iron Works, Inc., Houston, Tex.
Carpenter Valve Corp., The, Cleveland, O.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Circle Seal Products Co., Inc., Pasadena, Calif.
Cla-Val Co., Newport Beach, Calif.
Commercial Shearing & Stamping Co., Youngstown, O.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Fulflo Specialties Co., Inc., The, Blanchester, O.

Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich.
Keckley Co., O. C., Skokie, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McDonnell & Miller, Inc., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Pantex Mfg. Corp., Hydraulic Div., Pawtucket, R. I.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Republic Mfg. Co., Inc., Cleveland, O.
Ross Valve Mfg. Co., Troy, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
Trane Co., The, La Crosse, Wis.
Tryco Products, Inc., Westfield, Mass.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Webster Electric Co., Racine, Wis.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.
Wilson Co., K. R., Arcade, N. Y.

VALVES, RELIEF, OIL

American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Circle Seal Products Co., Inc., Pasadena, Calif.
Cla-Val Co., Newport Beach, Calif.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Davis Regulator Corp., Chicago, Ill.
Durabla Mfg. Co., New York, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Jamaica, N. Y.
Grove Valve and Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hauck Mfg. Co., Brooklyn, N. Y.
Hubbell Corp., Mundelein, Ill.
Keckley Co., O. C., Skokie, Ill.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lancaster Heat Transfer Co., Inc., Brooklyn.
Locke Regulator Co., Salem, Mass.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Milton Roy Co., Philadelphia, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia. (for oil handling)
Mueller Co., Decatur, Ill.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Mfg. Co., Cleveland, O.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Staples & Pfeiffer, San Francisco, Calif.
Texsteam Corp., Houston, Tex.
Watson & McDaniel Co., Philadelphia, Pa.
Webster Electric Co., Racine, Wis.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, SADDLE

Beckett & Co., Inc., Thomas, Dallas, Tex.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., The, New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Madden Brass Products Co., Aurora, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Walworth Co., New York, N. Y.

VALVES, SAFETY CLEANOUT

Petrometer Corp., Long Island City, N. Y.

VALVES, SAFETY, STEAM

American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
Associated Valve & Engineering Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Crosby Valve & Gage Co., Wrentham, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Keckley Co., O. C., Skokie, Ill.
Kunkle Valve Co., Ft. Wayne, Ind.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
New York Air Valve Corp., Brooklyn, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Rockwood Sprinkler Co., Worcester, Mass.
Scott Valve Mfg. Co., Detroit, Mich.
Texsteam Corp., Houston, Tex.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.

VALVES, SAMPLING

Cooper Alloy Corp., Hillside, N. J.
Dahl, G. W., Bristol, R. I.
Greenwood Valve Div. of Vernon Tool Co., Ltd., Alhambra, Calif.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Powell Co., William, Cincinnati, O.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

VALVES, SLIDE

Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Fabri-Valve Co. of America, Portland, Ore.
General Ceramics Corp., Keasbey, N. J. (chemical stoneware)
General Controls Co., Glendale, Calif.
Jenkins Bros., New York, N. Y.
Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Rockwell Co., W. S., Fairfield, Conn.
Walworth Co., New York, N. Y.
Webster Electric Co., Racine, Wis.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, SOLDER JOINT

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., The, New York, N. Y.
Hammond Brass Works, Hammond, Ind.
Jenkins Bros., New York., N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Nibco, Inc., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Pittsburgh Valve Co., Reedsville, W. Va.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Valco, Inc., Cincinnati, O.
Walworth Co., New York, N. Y. (Silver brazed)

VALVES, SOLENOID

A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Airmatic Valve, Inc., Cleveland, O.
Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
Associated Valve & Engineering Co., Chicago, Ill.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Automatic Switch Co., Florham Park, N. J.
Barksdale Valves, Los Angeles, Calif.
Baso, Inc., Milwaukee, Wis.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Newport Beach, Calif.
Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Controls Co. of America, Soreng Div., Schiller Park, Ill.
Copes-Vulcan Div., Blaw-Knox Co., Erie, Pa.
Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Davis Regulator Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Dole Valve Co., The, Morton Grove, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Erickson Specialty Co., Cohoes, N. Y.
Farris Flexible Valve Corp., Palisades Park, N. J.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Gould Co., J. D., Indianapolis, Ind.
Granberg Corp., Oakland, Calif.
Grove Valve and Regulator Co., Oakland, Calif.
Hanna Engineering Wks., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hauck Mfg. Co., Brooklyn, N. Y.
Hays Mfg. Co., Erie, Pa.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hubbell Corp., Mundelein, Ill.
Hunt & Son, Inc., C. B., Salem, O.
Jackes-Evans Mfg. Co., Controls Div., St. Louis, Mo.
Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Skokie, Ill.
Lammert & Mann Co., Chicago, Ill. (Gas safety shut-off)
Ledeen Mfg. Co., El Monte, Calif.
Magnatrol Valve Corp., Hawthorne, N. J.
Marsh Refrigeration Equipment Co., Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Marsh Instrument Co., Skokie, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia
Nicholson & Co., W. H., Wilkes-Barre, Pa.
North American Mfg. Co., Cleveland, O.
Penn Controls, Inc., Goshen, Ind.
R.K.L. Valve & Mfg. Co., Maple Shade, N. J.
Ranco Inc., Columbus, O.
Refrigerating Specialties Co., Chicago, Ill.
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Security Valves Corp., Glendale, Calif.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Spence Engineering Co., Inc., Walden, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Squires Co., C. E., The, Cleveland, O.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Watkins Co., J. E., Maywood, Ill.
Webster Electric Co., Racine, Wis.
White-Rodgers Co., St. Louis, Mo.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, STEAM-JACKETED

Alloy Steel Products Co., Linden, N. J. (Stainless steel)

Associated Valve & Engineering Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Everlasting Valve Co., Jersey City, N. J.
Gato Valve Co., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hetherington & Berner, Inc., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Red Jacket Co., Inc., Carnegie, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Valve & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Wedgeplug Valve Co., Div. of Stockham Valves & Fittings, Birmingham, Ala.

VALVES, 2, 3 AND 4 WAY

Airmatic Valve, Inc., Cleveland, O.
Alco Valve Co., St. Louis, Mo.
American Car & Foundry Div. of ACF Industries, Inc., New York, N. Y.
Anderson Brass Co., Detroit, Mich.
Aqua Matic, Inc., Rockford, Ill.
Atkomatic Valve Co., Inc., Indianapolis, Ind.
Automatic Switch Co., Florham Park, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Barworth, Inc., Summit, N. J.
Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Bordo Co., Inc., L. J., Glenside, Pa. (plug)
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Newport Beach, Calif.
Commercial Shearing & Stamping Co., Youngstown, O.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Dahl, G. W., Bristol, R. I.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
De Zurik Corp., Sartell, Minn.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gardner-Denver Co., Quincy, Ill.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Hanna Engineering Wks., Chicago, Ill.
Henry Valve Co., Melrose Park, Ill.
Holby Tempering Valve Co., New York, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Kerotest Div., Miller Printing Machinery Corp., Pittsburgh, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Ledeen Mfg. Co., El Monte, Calif.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marsh Valve Co., Dunkirk, N. Y.
McDonald Mfg. Co., A. Y., Dubuque, Ia.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Brass Co., Port Huron, Mich.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Ohio Brass Co., Mansfield, O.
Penn Controls, Inc., Goshen, Ind.
Permutit Co., New York, N. Y.
Powell Co., Wm., Cincinnati, O.
Ranco Inc., Columbus, O.
Republic Mfg. Co., Cleveland, O.
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Semet-Solvay Engineering Div., Allied Chemicals & Dye Corp., New York, N. Y.
Skinner Electric Valve Div., The Skinner Chuck Co., New Britain, Conn.
Smith Co., S. Morgan, York, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Wach Co., E. H., The, Chicago, Ill.
Walworth Co., New York, N. Y. (Lubricated plug valves)
Warren Engineering Co., Broadway, N. J.
Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Webster Electric Co., Racine, Wis.
Whittaker Controls, A Div. of Telecomputing Corp., Los Angeles, Calif.

VALVES, WATER GAGE

Associated Valve & Engineering Co., Chicago, Ill.
Cooper Alloy Corp., Hillside, N. J.
Crane Co., Chicago, Ill.
Defender Instrument & Regulator Co., Boody, Ill.
Edward Valves, Inc., East Chicago, Ind.
Ernst Water Column & Gauge Co., Livingston, N. J.
Keckley Co., O. C., Skokie, Ill.
Longergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.

VANES, DUCT TURNING, PREFABRICATED

Anemostat Corp. of America, New York, N. Y. (Equalizing deflectors)
Barber-Colman Co., Rockford, Ill.
Cain Mfg. Co., Birmingham, Ala.
Duro-Dyne Corp., New Hyde Park, L. I. N. Y.
Elgen Mfg. Corp., Long Island City, N. Y.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Waterloo Register Co., Inc., Waterloo, Iowa

VAPOR BARRIERS

See Barriers, Vapor

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VAPORIZERS FOR PROPANE-BUTANE

Buxton Mfg. Co., Dover, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Mitchell Co., John E., Dallas, Tex.
Mutual Liquid Gas & Equipment Co., Gardena, Calif.
Ransome Co., Emeryville, Calif.

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY, REGULATORS

See Regulators, Air Velocity

VENT FLUE CAPS

See Caps, Vent Flue

VENTILATING HOSE

See Ducts and Duct Fittings. Prefabricated, Flexible and Non-Flexible, Metallic and Non-Metallic; Hose, Flexible, Metal and Fittings

VENTILATION HEATERS

See Surface, Pinned, Heating; Ventilators, Roof, Fan; Ventilators, Unit

VENTILATORS, MUSHROOM

Aladdin Heating Corp., San Leandro, Calif.
Atmos Corp., Chicago, Ill.
Burt Mfg. Co., Akron, O.
Carnes Corp., Verona, Wis.
Chicago Blower Corp., Franklin Park, Ill.
Cook Co., Loren, Berea, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Detroit Blower Corp., Franklin Park, Ill.
Jenn-Air Products Co., Indianapolis, Ind.
Knight, Maurice A., Akron, O. (Stoneware)
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Martin Fan & Blower Co., Chicago, Ill.
Muckle Mfg. Co., Owatonna, Minn.
Peerless Electric Co., Warren, O.
Penn Ventilator Co., Philadelphia, Pa.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Robinson Clay Product Co., Akron, O.
University Fan & Blower Co., Berkeley, Calif.
Uno Ventilator Co., Malden, Mass.
Van Noorden Co., E., Boston, Mass.

VENTILATORS, ROOF, FAN

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airjet Ventilator Co., San Clemente, Calif.
Air & Refrigeration Corp., New York, N. Y.
Aladdin Heating Corp., San Leandro, Calif.
Allen Cooler & Ventilator, Inc., Rochester, Mich.
American Blower Corp., Detroit, Mich.
American Steel Band Co., Pittsburgh, Pa.
Ammerman Co., Inc., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Atmos Corp., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Bertram Co., Harvey P., The, Cincinnati, O.
Bishop & Babcock Mfg. Co., Cleveland, O.
Breidert Co., G. C., San Fernando, Calif.
Brookside Corp., McCordsville, Ind.
Burt Mfg. Co., Akron, O.
Carnes Corp., Verona, Wis.
Century Fan & Ventilator Co., Stamford, Conn.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Clay Equipment Corp., Cedar Falls, Ia.
Colt Ventilation Co. of America, Inc., Los Angeles, Calif.
Commercialaire Corp. of America, Brooklyn, N. Y.
Cook Co., Loren, Berea, O.
Dana Fan & Blower Corp., Cincinnati, O.
Davidson Hyduty Roof Fan Co., Newton, Mass.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Detroit Blower Corp., Franklin Park, Ill.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Donaldson Div., Marvin D. Shafer Co., Inc., Los Angeles, Calif.
Dryer Electric Corp., Fan Div., Brooklyn, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Gallaher Co., The, Omaha, Neb.
General Blower Co., Morton Grove, Ill.
Genie-Air, Los Angeles, Calif.
Hartzell Propeller Fan Co., Piqua, O.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Heating Assurance, Inc., Spokane, Wash.
Hill Co., Francis, Cleveland, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Hudson Mfg. Co., H. D., Chicago, Ill.
Hunter Div., Robbins & Myers, Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iron Lung Ventilator Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Jenn-Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
King Co. of Owatonna, The, Owatonna, Minn.
Kody Blower Co., Trenton, N. J.
M & E Mfg. Co., Indianapolis, Ind.

Martin Fan & Blower Co., Chicago, Ill.
Moore Co., The, Marceline, Mo.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Octagon Ventilator Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Penn Ventilator Co., Philadelphia, Pa.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Robertson Co., H. H., Pittsburgh, Pa.
Sargent Enginairing Co., Cleveland, O.
South Bend Air Products, Inc., South Bend, Ind.
Swartwout Co., The, Cleveland, O.
Trade-Wind Motorfans, Inc., Rivera, Calif.
Trane Co., The, La Crosse, Wis. (available with heating coils)
Tripar Products, Inc., Royal Oak, Mich.
Truflo Fan Co., Harmony, Pa.
University Fan & Blower Co., Berkeley, Calif.
Uno Ventilator Co., Malden, Mass.
Van Noorden Co., E., Boston, Mass.
Waverly Heating Supply Co., Beverly, Mass.
Western Engineering & Mfg. Co., Venice, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.
Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.

VENTILATORS, ROOF, GRAVITY

Accurate Sheet Metal & Mfg. Works, Chicago.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Airjet Ventilator Co., San Clemente, Calif.
Allen Cooler & Ventilator, Inc., Rochester, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Metal Works, Inc., New Orleans
American Steel Band Co., Pittsburgh, Pa.
Ammerman Co., Inc., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Atmos Corp., Chicago, Ill.
Breidert Co., G. C., San Fernando, Calif.
Brisk Metal Products, New York, N. Y.
Brookside Corp., McCordsville, Ind.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Clay Equipment Corp., Cedar Falls, Ia.
Colt Ventilation Co. of America, Inc., Los Angeles, Calif.
Donaldson Div., Marvin D. Shafer Co., Inc., Los Angeles, Calif.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Greenheck Fan & Ventilator Corp., Schofield, Wis.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Hudson Mfg. Co., H. D., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Metal Products, Phoenix, Ariz.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Leslie Welding Co., Inc., Chicago, Ill.
Levow, David, Brooklyn, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
Octagon Ventilator Co., Chicago, Ill.
Penn Ventilator Co., Philadelphia, Pa.
Plasteel Products Corp., Washington, Pa.
Puhl & Hepper Mfg. Co., Inc., St. Louis Mo.
Robertson Co., H. H., Pittsburgh, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Sioux Steel Co., Sioux Falls, S. D.
Souther Iron Co., E. E., St. Louis, Mo.
Swartwout Co., The, Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Triangle Engineering Co., Houston, Tex.
University Fan & Blower Co., Berkeley, Calif.
Uno Ventilator Co., Malden, Mass.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., F., Boston, Mass.
Walker Jamar Co., Duluth, Minn.
Walker Mfg. & Sales Co., St. Joseph, Mo.
Warner Ventilator Co., La Grange, Ind.
Waverly Heating Supply Co., Beverly, Mass.
Western Engineering & Mfg. Co., Venice, Calif.
Willis Steel Corp., Galesburg, Ill.

VENTILATORS, ROOF, WITH FUSIBLE LINKS, FOR VENTING PRODUCTS OF COMBUSTION

Airjet Ventilator Co., San Clemente, Calif.
American Metal Works, Inc., New Orleans.
Atmos Corp., Chicago, Ill.
Bertram Co., The Harvey P., Cincinnati, O.
Burt Mfg. Co., Akron, O.
Chicago Blower Corp., Franklin Park, Ill.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Detroit Blower Corp., Franklin Park, Ill.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kody Blower Co., Trenton, N. J.
Mahon Co., R. C., The, Detroit, Mich.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Robertson Co., H. H., Pittsburgh, Pa.
Swartwout Co., The, Cleveland, O.
University Fan & Blower Co., Berkeley, Calif.
Van Noorden Co., E., Boston, Mass.

VENTILATORS, UNIT, ELECTRIC HEATING ELEMENT

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
Nesbitt, Inc., John J., Philadelphia, Pa.
Vulcan Radiator Co., Hartford, Conn.
Wesix Electric Heater Co., San Francisco.
Wiegand Co., Edwin L., Pittsburgh, Pa.

VENTILATORS, UNIT, GAS

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
Lennox Industries Inc., Des Moines, Ia.
Norman Products Co., Inc., Columbus, O.

VENTILATORS, UNIT, HOT WATER AND STEAM

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Blazer & Son, M., Passaic, N. J.
Kody Blower Co., Trenton, N. J.
Nesbitt, Inc., John J., Philadelphia, Pa.
Rittling Corp., The, Buffalo, N. Y.
Trane Co., The, LaCrosse, Wis.
Vulcan Radiator Co., Hartford, Conn.
Wood Mfg. Co., A. R., Luverne, Minn.

VENTILATORS, WALL, FAN

American Coolair Corp., Jacksonville, Fla.
Barnebey-Cheney Co., Columbus, O. (with activated charcoal)
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Hudson Mfg. Co., H. D., Chicago, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Jenn-Air Products Co., Indianapolis, Ind.
Kody Blower Co., Trenton, N. J.
Martin Fan & Blower Co., Chicago, Ill.
Phelps Mfg. Co., Little Rock, Ark.

VENTS, RELIEF, AND INTAKE, AIR

Bertram Co., The Harvey P., Cincinnati, O.
Ilg Electric Ventilating Co., Chicago, Ill.
Jenn-Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis.
Kody Blower Co., Trenton, N. J.
Muckle Mfg. Co., Owatonna, Minn.
Somers Corp., Detroit, Mich.
Universal Valve Co., Elizabeth, N. J.

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Flexible, Metal and Fittings

VISCOSIMETERS

American Instrument Co., Inc., Silver Spring, Md.
Brabender Corp., Rochelle Park, N. J. (recording)
Bristol Co., The, Waterbury, Conn.
Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Drage Products, Inc., Union City, N. J.
Fischer & Porter Co., Hatboro, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Humboldt Mfg. Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Thomas Co., Arthur H., Philadelphia, Pa.
Thomas Industries, Inc., Electric Sprayit Div., Sheboygan, Wis.
Ultra-Viscoson Corp., The, Hartford, Conn.
Will Corp., Rochester, N. Y.

VISES, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O. (Sawing —for tubing)
Billings & Spencer Co., Hartford, Conn.
Capewell Mfg. Co., Hartford, Conn.
Columbian Vise & Mfg. Co., Cleveland, O.
Desmond-Stephan Mfg. Co., Urbana, O.
Erie Tool Wks., Erie, Pa.
Fine Products Co., Berwyn, Ill.
Hollands Mfg. Co., Erie, Pa.
Nye Tool Co., Chicago, Ill.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Springload Mfg. Corp., Seattle, Wash.
Talon Tools, Inc., North Arlington, N. J.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.
Vanderman Mfg. Co., Willimantic, Conn.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y.
Yost Mfg. Co., Cambridge Springs, Pa.

VISES, SHEET METAL WORKERS'

Columbian Vise & Mfg. Co., Cleveland, O.
Desmond-Stephan Mfg. Co., Urbana, O.
Milton Equipment Co., Philadelphia, Pa.
Yost Mfg. Co., Cambridge Springs, Pa.

WARM AIR FURNACES

See Furnaces, Warm Air

WASHERS, AIR

Air & Refrigeration Corp., New York, N. Y.
Air-Cooling Engineering Co., Evanston, Ill.
Airfan Engineering Co., Los Angeles, Calif.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
Automotive Rubber Co., Inc., Detroit, Mich.
Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Centri-Spray Corp., Livonia, Mich. (Wet type)
Century Engineering Corp., Cedar Rapids, Ia.
Clarage Fan Co., Kalamazoo, Mich.
Comfort Products Inc., Dallas, Tex.
Continental Air Filters, Inc., Louisville, Ky.
DeVilbiss Co., The, Toledo, O.
Donaldson Div., Marvin D. Shafer Co., Inc., Los Angeles, Calif.
Drying Systems Co., Chicago, Ill.
Ducon Co., Inc., The, Mineola, N. Y.
Johnson-March Corp., Philadelphia, Pa.
Mahon Co., R. C., The, Detroit, Mich.
Marlo Coil Co., St. Louis, Mo.
Master Fan Corp., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Parks-Cramer Co., Fitchburg, Mass.
Peters-Dalton, Inc., Detroit, Mich.
Schmieg Industries Inc., Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
Spray Engineering Co., Burlington, Mass.
Surface Combustion Corp., Toledo, O.
Trane Co., The, LaCrosse, Wis.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
York Corp., Subsidiary of Borg-Warner Corp., York, Pa.

WASHERS, FUME

Automotive Rubber Co., Inc., Detroit, Mich.
Carrier Corp., Syracuse, N. Y.

Centri-Spray Corp., Livonia, Mich. (wet type)
Ducon Co., Inc., The, Mineola, N. Y.
General Ceramics Corp., Keasbey, N. J. (plastic & ceramic)
Heil Process Equipment Corp., Cleveland, O.
Johnson-March Corp., Philadelphia, Pa.
Knight Maurice A., Akron, Ohio (wet type)
Mahon Co., R. C., The, Detroit, Mich.
Master Fan Corp., Los Angeles, Calif.
Oxy Catalyst, Inc., Wayne, Pa.
Peabody Engineering Corp., New York, N. Y.
Schmieg Industries, Inc., Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemicals & Dye Corp., New York, N. Y.

WATER CHILLERS

See Chillers, Water, for Air Conditioning and Refrigeration, Compressors, Refrigerating, Combined with Condenser, Water Chiller, Piping Connections, and Controls

WATER DISTRIBUTORS FOR CONDENSERS

See Distributors, Water, for Condensers

WATER HAMMER ELIMINATORS

See Absorbers, Shock, Liquid

WATER RAMS FOR CLEANING OUT PIPE LINES

See Rams, Water

WATER STERILIZER, ULTRAVIOLET

See Units, Sterilizing, Water

WATER TREATMENT

See Treatment, Water; Devices, Electrolytic, for Preventing Corrosion

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

Air Reduction Co., Inc., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Borm Mfg. Co., Elgin, Ill.
Burdett Oxygen Co. of Calif., Huntington Park, Calif.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing N. Y.
Fern, Ralph, Scranton, Pa.
Hammett Electric Mfg. Co., Kansas City, Mo.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Linde Co., Div. of Union Carbide Corp., New York, N. Y. (Inert gas-shielded)
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Metal & Thermit Corp., Rahway, N. J.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Precision Welder Mfg. Co., Chicago, Ill.
Sight Feed Generator Co., West Alexandria O.
Smith Corp., A. O., Milwaukee, Wis.
Trindl Products, Ltd., Chicago, Ill.
Tweco Products Inc., Wichita, Kan. (Cable connectors, electrode holders and accessories and welding cable)
United Specialties, Inc., El Dorado, Ark. (welding cable reel)
Welding Apparatus Co., Chicago, Ill.
Weldit, Inc., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa
Will-Weld Mfg. Co., Inc., Omaha, Neb.

WELDERS, FOR PLASTIC PIPE OR PLASTIC SHEET

American Agile Corp., Bedford, O.
Saran Lined Pipe Co., Ferndale, Mich. (electric & acetylene types)
Seelye Craftsmen, The, Minneapolis, Minn.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif.
Acro Welder Mfg. Co., Milwaukee, Wis.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alphil Spot Welder Mfg. Corp., Brooklyn, N. Y.
Delta Welder Corp., Detroit, Mich.
Duro-Dyne Corp., New Hyde Park, L. I. N. Y. (portable)
Eisler Engineering Co., Inc., Newark, N. J.
Fern, Ralph, Scranton, Pa.
Hammett Electric Mfg. Co., Kansas City, Mo.
Linde Co., Div of Union Carbide Corp., New York, N. Y. (Inert gas-shielded arc)
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Mallory & Co., Inc., P. R., Indianapolis, Ind. (electrode holders)
Micro Products Co., Chicago, Ill.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Milton Equipment Co., Philadelphia, Pa.
National Cylinder Gas Co., Chicago, Ill.
Peer, Inc., Benton Harbor, Mich.
Research Vacuum Supply Co., Chicago, Ill
Rex Welder Co., Kansas City, Mo.
Sciaky Bros., Inc., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Thomson Electric Welder Co., Lynn, Mass.
Universal Welder Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.
Weldit, Inc., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa.

WELDERS, STUD

Eisler Engineering Co., Inc., Newark, N. J.
Graham Manufacturing Co., Needham Hts., Mass.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hobart Bros. Co., Troy, O.
KSM Products, Inc., Merchantville, N. J.
Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.

WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

Air Reduction Co., Inc., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Arcos Corp., Philadelphia, Pa. (arc-oxygen)
Atlas Welding Accessories Inc., Ferndale, Mich. (Weld cleaning tools)
Dockson Corp., Detroit, Mich.
Eutectic Welding Alloys Corp., Flushing, N. Y.
Evans Machine Co., Inc., Baltimore, Md.
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
K-G Equipment Co., Allentown, Pa.
Lenco, Inc., Jackson, Mo.
Linde Co., Div of Union Carbide Corp., New York, N. Y.
Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Sight Feed Generator Co., West Alexandria, O. (portable and stationary acetylene generators)
Smith Welding Equipment Corp., Minneapolis, Minn.
United Specialties, Inc., El Dorado, Ark. (welding hose reel)
Vernon Tool Co., Ltd., Alhambra, Calif.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Weldit, Inc., Detroit, Mich.

WELDING COMPOUNDS

See Compounds, Welding

WELDING FUME COLLECTORS

See Exhausters, Welding Fume

WELDING RINGS

See Rings, Backing, for Pipe Welding

WELLS, THERMOMETER

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Bristol Co., The, Waterbury, Conn.
Campbell Co., J. A., Long Beach, Calif.
Corning Glass Works, Corning, N. Y.
Engelhard, Inc., Charles, East Newark, N. J.
Foxboro Co., Foxboro, Mass.
General Ceramics Corp., Keasbey, N. J. (graphite)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Pacific Transducer Corp., Los Angeles, Calif.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., Freeport, N. Y.

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airfan Engineering Co., Los Angeles, Calif.
Barry Blower Co., Minneapolis, Minn.
Bayley Blower Co. Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Bronson Fan Mfg. Corp., Los Angeles, Calif.
Brundage Co., The, Kalamazoo, Mich.
Burden Div., Torrington Mfg. Co., Los Angeles, Calif.
Carolina Blower Co., Inc., Greensboro, N. C.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Denbo Engineering & Sales Co., Inc., Indianapolis, Ind. (molded plastics)
Garden City Fan Co., Chicago, Ill.
General Blower Co., Morton Grove, Ill.
Hastings Air Control, Inc., Omaha, Nebr.
Industrial Plastic Fabricators, Norwood, Mass. (PVC)
Jan-Air, Inc., Richmond, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Master Fan Corp., Los Angeles, Calif.
Mayne Products Co., Dayton, O.
Moore Co., The, Marceline, Mo.
Morrison Products, Inc., Cleveland, O.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Power Engineering Corp., Weirton, W. Va.
Revcor Inc., Carpentersville, Ill.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Torrington Mfg. Co., Torrington, Conn.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
United States Air Conditioning Div., Hughes & Keenan Co., Delaware, O.
Utility Appliance Corp., Los Angeles, Calif.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Viking Air Products, Div. of National-U. S. Radiator Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

WHITE PRINT MACHINES

See Machines, Blue Print and White Print

WINDOW PANELS FOR AIR CONDITIONERS

See Panels, Window, for Air Conditioners

WINDOW VENTILATOR AND FILTER UNITS

See Units, Window Ventilator and Filter

WINDOWS, HEAT INSULATING

Anderson Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Co., St. Louis, Mo.
Pam Co., The, Portland, Ore. (skylight)
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.
Southern Plastics Co., Columbia, S. C.

WIRE, ELECTRIC, NUMBERED, FOR CONTROL SYSTEMS

Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.

Essex Wire Corp., Ft. Wayne, Ind.
Gavitt Wire & Cable Co., Div. of American Hard Rubber Co., Brookfield, Mass.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Midwest Air Conditioning Co., Des Moines.
Midwest Automatic Control Co., Des Moines, Ia.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Rubber Co., New York, N. Y.
Westline Products Div. of Western Lithograph Co., Los Angeles, Calif.

WIRE, INSTRUMENT

Chester Cable Corp., Chester, N. Y.
Essex Wire Corp., Ft. Wayne, Ind.
Foxboro Co., Foxboro, Mass.
Gavitt Wire & Cable Co., Div. of American Hard Rubber Co., Brookfield, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Thermo Electric Co., Inc., Saddle Brook, N. J.
United States Rubber Co., New York, N. Y.

WIRE, OIL BURNER IGNITION

Chester Cable Corp., Chester, N. Y.
Dielectric Products Co., Inc., Jersey City, N. J.
Essex Wire Corp., Ft. Wayne, Ind.
Packard Electric Div., General Motors Corp., Warren, O.
Phelps Dodge Copper Products Corp., New York, N. Y.
United States Rubber Co., New York, N. Y.

WIRING, COMPLETE ASSEMBLIES, CUSTOM-MADE

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Cornish-Rutland Co., Williamstown, Mass.
Dielectric Products Co., Inc., Jersey City, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Essex Wire Corp., Ft. Wayne, Ind.
Gavitt Wire & Cable Co., Div. of American Hard Rubber Co., Brookfield, Mass.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Hammett Electric Mfg. Co., Kansas City, Mo.
Kulka Electric Mfg. Co., Inc., Mt. Vernon, N. Y.
Packard Electric Div., General Motors Corp., Warren, O.

WRAP, PIPE

Asbestos Asphalt Insulation Co., Chicago, Ill.
Canvas Products Co., St. Louis, Mo.
Johns-Manville, New York, N. Y.
L. O. F. Glass Fibers Co., Toledo, O.
Minnesota Mining & Mfg. Co.. St. Paul.
Mortell Co., J. W., Kankakee, Ill.
Rhopac, Inc., Skokie, Ill.
Tapecoat Co., The, Evanston, Ill. (cool tar protective coating in tape form for pipe, pipe joints, pipe fittings, insulated pipe underground and above ground.)

WRENCHES, CHAIN, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Nye Tool Co., Chicago, Ill.
Reed Mfg. Co., Erie, Pa.
Talon Tools, Inc., North Arlington, N. J.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.

WRENCHES, PIPE

American Machine Wks., Inc., Racine, Wis.
Armstrong Bros. Tool Co., Chicago, Ill.
Basford Co., H. R., San Francisco, Calif.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg., Hartford, Conn.
Crescent Tool Co., Jamestown, N. Y.
Erie Tool Works, Erie, Pa.
Frontier Bronze Corp., Niagara Falls, N. Y.
International Forge Co., Chicago, Ill. (aluminum)
Lowell Wrench Co., Worcester, Mass.
Lurie & Lurie, Chicago, Ill.
Nielsen, Inc., E. V., Stamford, Conn.
Nye Tool Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Ridge Tool Co., Elyria, O.
Roddick Tool Co., Anaheim, Calif.
Sac Tool Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Talon Tools, Inc., North Arlington, N. J.
Tedd Company, The, Rockford, Ill.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.
Walworth Co., New York, N. Y.

WRENCHES, PIPE, REPLACEABLE JAW

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Crescent Tool Co., Jamestown, N. Y.
Erie Tool Wks., Erie, Pa.
International Forge Co., Chicago, Ill.
Lurie & Lurie, Chicago, Ill.
Nye Tool Co., Chicago, Ill.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Ridge Tool Co., Elyria, O.
Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.
Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Fairmount Tool & Forging, Inc., Cleveland, O.
Gardner-Denver Co., Quincy, Ill.
Greene, Tweed & Co., North Wales, Pa.
Kent-Moore Organization, Inc., Warren, Mich.
Lowell Wrench Co., Worcester, Mass.
Lurie & Lurie, Chicago, Ill.
National Pipe Coatings, Inc., Huntington Park, Calif.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, TORQUE INDICATING

Ammco Tools, Inc., North Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Fairmont Tool & Forging, Inc., Cleveland, O.
Ingersoll-Rand Co., New York, N. Y.
JO-Line Tools, Inc., South Gate, Calif.
Kent-Moore Organization, Inc., Warren, Mich.
Portable Electric Tools, Inc., Chicago, Ill.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Richmont, Inc., Monrovia, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp, Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
Williams & Co., J. H., Buffalo, N. Y.
Wilson Co., K. R., Arcade, N. Y.
X-4 Corp., West Concord, Mass. (geared head)

X-RAY MACHINES AND FILM

See Machines and Film, X-Ray

ZONE CONTROLS

See Systems, Heating, Zone Control

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRIAL AND ALL OTHER LARGE BUILDINGS

PART 3—ALL TRADE NAMES

A-3 Deoterge—Cleaning compounds. Airkem, Inc., New York, N. Y.
A-B—Motor controllers, regulators, relays, solenoids, switches, valves. Allen-Bradley Co., Milwaukee, Wis.
ABC—Dehumidifiers, humidifiers, dust collectors. American Blower Corp., Detroit, Mich.
ABR-A-Saw—Cutters, tools. Collins Machinery Corp., Los Angeles, Calif.
A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.
ACB—Coatings. Tropical Paint & Oil Co., Cleveland, O.
AECR—Air Conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
AISI Automatic Smoke Sampler—Testers, smoke. Research Appliance Co., Allison Park, Pa.
A & R—Dehumidifiers. Air & Refrigeration Corp., New York, N. Y.
ARR 300#—Unions. Jefferson Union Co., Lexington, Mass.
ARRC—Couplings, fittings, flanges, unions. Union Metal Wks. Co., Inc., Chelsea, Mass.
ASME—Regulators. Bell & Gossett Co., Morton Grove, Ill.
Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Absolute—Air filters. Cambridge Filter Corp., Syracuse, N. Y.
Ace—Dampers. Marsto Machine Co., West Quincy, Mass.
Ace—Fittings, pipe, protective coatings, pumps, tanks, valves. American Hard Rubber Co., Div. Amerace Corp., Butler, N. J.
Ace-Flex—Plastic tubing. American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Ace-Ite—Plastic pipe, fittings, valves. American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Ace Riviclor—Fittings, pipe, valves. American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Ace-Saran—Plastic tubing, fittings. American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Ace Tempron—Fittings, pipe. American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Ace-Vent—Valves. Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Acipco—Steel tubing. American Cast Iron Pipe Co., Birmingham, Ala.
Acolite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Acoustilite—Insulation. Insulite Div. Minnesota & Ontario Paper Co., Minneapolis, Minn.
Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Acrowrap—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Actex—Heat exchangers. Wabash Corp., Chicago, Ill.
Actrol—Valves. Baso, Inc., Milwaukee, Wis.
Adacast—Refractories. Botfield Refractories Co., Philadelphia, Pa.
Adamant—Furnace cement, refractories and refractory cement. Botfield Refractories Co., Philadelphia, Pa.
Adapatch—Refractories. Botfield Refractories Co., Philadelphia, Pa.
Adastic—Insulating cement, insulation. Botfield Refractories Co., Philadelphia, Pa.
Adjusta-Flo—Valves. Sullivan Valve & Engineering Co., Butte, Mont.
Adjusto—Racks. Haertel Co., Walter, Minneapolis, Minn.
Adjust-O-Feeder—Feeders, pumps, water treatment. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Adjust-O-Slide—Motor bases. American Pulley Co., The, Philadelphia, Pa.
Adjustor—Heating systems, elbows. The Kehm Corp., Chicago, Ill.
Adsorbit—Air freshening compounds, adsorbers, dehumidifiers, filters. Barnebey-Cheney Co., Columbus, O.
Advance—Scaffolds. Beaver Advance Corp., Ellwood City, Pa.
Aeracool—Blades, fans. Myers Electric Co., Inc., Pittsburgh, Pa.
Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Aero—Aftercoolers, heat exchangers. Niagara Blower Co., New York, N. Y.
Aero—Radiation, hangers or brackets. National-U. S. Radiator Corp., Johnstown, Pa.
Aerodyne—Fans, ventilators. Jeffrey Mfg. Co., Columbus, O.
Aerodyne—Collectors. Green Fuel Economizer Co., Inc., The, Beacon, N. Y.
Aerofuse—Air diffusers. Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Aerolux—Air conditioning units. Johnson Co., S. T., Oakland, Calif.
Aeromaster—Propeller fans, blades. Koppers Company, Inc., Metal Products Div., Baltimore, Md.
Aeromatic Exhauster—Ventilators. Octagon Ventilator Co., Chicago, Ill.
Aeropass—Condensers. Niagara Blower Co., New York, N. Y.
Aeropel—Ventilators. American Blower Corp., Detroit, Mich.
Aeroplane—Roof ventilators. Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.
Aeropull—Roof ventilators. Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Aerosolve—Air filters. Cambridge Filter Corp., Syracuse, N. Y.
Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.
Aeroturn—Collectors. Koppers Co., Inc., Metal Products Div., Baltimore, Md.
Aerovane—Anemometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Aerovane—Grilles, registers. Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Aertite—Compounds. Johns-Manville, New York, N. Y.
Afco—Heaters, air conditioning units. American Furnace Co., St. Louis, Mo.
Affco—Louvers and shutters, dampers. American Foundry & Furnace Co., Bloomington, Ill.
Agastat—Electrical relays. A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J.
Agaswitch—Time switches. A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J.
Agilene—Fittings, fans, sheets, ducts and duct fittings, pipe, tubing, welders, valves. American Agile Corp., Bedford, O.
Agilide—Ducts and duct fittings, fans, sheets, pipe, welders, valves. American Agile Corp., Bedford, O.
Agitair—Air diffusers, filters, dampers, ventilators. Air Devices, Inc., New York.
Airacoustic—Insulation. Johns-Manville, New York, N. Y.
Air-aid—Compounds. Lord & Clark Co., Inc., Boston, Mass.
Air Base—Diffusers. Kritzer Radiant Coils, Inc., Batavia, Ill.
Air Cell—Asbestos insulation. Keasbey & Mattison Co., Ambler, Pa.
Aircell Board—Insulation, Sheets. Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa.
Airco—Arc welders, electrodes, weld testing, welding rod, solder, machines, torches. Air Reduction Co., Inc., New York, N. Y.
Aircon—Condensers. McQuay, Inc., Minneapolis, Minn.
Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Aircoustat—Absorbers. Industrial Sound Control Dept. of Koppers Co., Inc., Metal Products Div., Baltimore, Md.
Airditioner—Air conditioning units. Modine Mfg. Co., Racine, Wis.
Airefiner—Water treatment. Oakite Products, Inc., New York, N. Y.
AIRefrigeration—Air conditioning units. Williamson Co., Cincinnati, O.
Aire-Rectifier—Coolers, air conditioning units. Lintern Corp., Painesville, O.
Airette—Roof ventilators. Penn Ventilator Co., Philadelphia, Pa.
Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.
Airflex—Couplings. Falk Corp., Milwaukee.
Air-flo—Louvers and shutters, regulators. Air Conditioning Products Co., Detroit, Mich.
Airflow Control—Fume disposal hoods. Kewaunee Mfg. Co., Adrian, Mich.
Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.
Airfoil—Registers, scoops, grilles, dampers, diffusers. Titus Mfg. Corp., Waterloo, Ia.
Air Guide—Vanes. Titus Mfg. Corp., Waterloo, Ia.
Air Guide—Radiation. Rempe Co., Chicago.
Airion—Ionization apparatus, sterilizing units. Dryomatic Corp., Alexandria, Va.
Airistocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.
Airistocrat—Fan blades, propeller fans. Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Airjector—Ventilators. Swartwout Co., Cleveland, O.
Air Kits—Blower wheels. New York Blower Co., Chicago, Ill.
Airlift—Ventilators. Swartwout Co., Cleveland, O.
Airline—Torches, welding and cutting apparatus. Smith Welding Equipment Corp., Minneapolis, Minn.
Air Line—Motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Airline-Norge Heat—Heaters, air conditioning units. Ingersoll Conditioned Air Div., Borg-Warner Corp., Kalamazoo, Mich.
Airliner—Fan blades, and fans. Burden Co., Alan E., Los Angeles, Calif.
Airlouver—Louvers and shutters. Swartwout Co., Cleveland, O.
Air Master—Diffusers, grilles, registers. Austin Engineering & Mfg. Co., Inc., Ysleta, Tex.
Airmaster—Dehumidifiers. Haertel Co., Walter, Minneapolis, Minn.
Air Mat-PC—Filters. American Air Filter Co., Inc., Louisville, Ky.
Airmat Arrester—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Airmat Drifilter—Filters. Airgard Mfg. Co. Chicago, Ill.
Air-Max—Dampers, diffusers, fans, unit heaters, ventilators. Gallaher Co., The, Omaha, Neb.
Air Meter—Air velocity meters. Hastings-Raydist, Inc., Hampton, Va.
Air Motor Valves—Valves. General Controls Co., Glendale, Calif.
Airmover—Ventilators. Swartwout Co., Cleveland, O.
Air Mover—Exhausters. Mine Safety Appliances Co., Pittsburgh, Pa.
Airocool—Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Airo-Flex—Registers. Auer Register Co., Cleveland, O.
Airoil—Oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Air-O-Matic—Air conditioning units. Williams Div., Eureka Williams Corp., Bloomington, Ill.
Air-O-Rator—Units, window ventilator and filter. Goodwill Mfg. Co., Chicago, Ill.
Airotor—Blower wheels. Torrington Mfg. Co., Torrington, Conn.
Airotor—Propeller fans, blower wheels. Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Airovent—Gas Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Airpak—Filters. Conoflow Corp., Subsidiary of Walworth Co., Philadelphia.
Airphlo Vent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Air Prover—Regulators. A-P Controls Div., Controls Co. of America, Milwaukee, Wis.
Air Rad—Radiation. Penn Boiler & Burner Corp., Lancaster, Pa.
Airsan—Filters. Air Filter Corp., Milwaukee.
Air-Scoop—Eliminators, air separators. Taco Heaters, Inc. Cranston, R. I.
Airstat—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Airswitch—Thermostats, regulators. Minneapolis-Honeywell Regulator Co., Minneapolis.
Airtrol—Air eliminators. Bell & Gossett Co., Morton Grove, Ill.
Airtron—Ducts and duct fittings, hose. Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.
Air-Tumbler—Dust collectors. Dust Suppression & Engineering Co., Lake Orion, Mich.

Air-Van—Ventilators, exhausters, fans. Gallaher Co., The, Omaha, Neb.
Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Air-X-it—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Airxpel—Traps. Wright-Austin Co., Detroit.
Airxpeler—Roof ventilators, dampers, fittings, hose, exhausters, fans, louvers and shutters, vent flue caps. Ammerman Co., Inc., Minneapolis, Minn.
Ajax—Gaskets. United States Gasket Co., Camden, N. J.
Akon—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.
Alaka—Protective coatings, enamels and lacquers. Alfred Hague & Co., Inc., Div. of Lacquer & Chemical Corp., Brooklyn, N. Y.
Alaskan—Fans, air conditioning units. National Engrg. & Mfg. Co., Sedalia, Mo.
Alathon—Plastics, powders and resins. duPont de Nemours & Co., E. I., Polychemicals Dept., Wilmington, Del.
Alberger—Aftercoolers, exchangers. Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Alcoa—Angles, compounds, rods, dehydrators, exchangers, pipe, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.
Alcoplate—Pipe. Alco Products, Inc., Schenectady, N. Y.
Alcotwin—Exchangers. Alco Products, Inc., Schenectady, N. Y.
Alcuplate—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alfol—Insulation. Reflectal Corp. Subsid., Borg-Warner Corp., Chicago, Ill.
Algaecide—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Algaecide—Water treatment. Anderson Chemical Co., Inc., Macon, Ga.
Algicide—Water treatment. North American Mogul Products Co., The, Cleveland, O.
Align E-Z—Pipe nipples. Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Aliron—Sheets, clad. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alkaline—Compounds. Turco Products, Inc., Los Angeles, Calif.
Alkasteem—Water treatment. Anderson Chemical Co., Inc., Macon, Ga.
Alkyd—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
All-Chem—Rotary pumps. Eco Engineering Co., Newark, N. J.
Allen—Benders. Steel City Electric Co., Pittsburgh, Pa.
Allencote—Refractories and refractory cement. Allen Co., Robert G., Mechanicsville. N. Y.
Allenite—Soot destroyers. Allen Co., Robert G., Mechanicsville, N. Y.
All-In-One—Regulators. Bell & Gossett Co., Morton Grove, Ill.
All-Motor—Gear-motors. Falk Corp., Milwaukee, Wis.
Allmul—Refractories and refractory cement. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Allprene—Gaskets. Chicago Gasket Co., Chicago, Ill.
All Purpose—Grilles. Louvra Mfg. & Sales Co., Union, N. J.
Allspeed Selector—Mechanical changers. Worthington Corp., East Orange, N. J.
Alltemp—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
All-Tite Vane Runner—Vanes. Elgen Mfg. Corp., Long Island City, N. Y.
Allumatic—Heaters. Hotstream Heater Co., Cleveland, O.
All-Weather Thinline—Air conditioning units. General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.
Alnifer—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alnor—Anemometers, indicator controllers, thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Alodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Aloyco—Gages, valves. Alloy Steel Products Co., Linden, N. J.
Alpine—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Alsiplate—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alternarc—Arc welders. Electric Arc, Inc., Newark, N. J.
Alumalung—Roof ventilators. Iron Lung Ventilator Co., Cleveland, O.
Alumilux—Heaters. Clayton & Lambert Mfg. Co., Louisville, Ky.
ALUMINIZED—Sheets, aluminum coated. Armco Steel Corp., Middletown, O.
Aluminum—Roof ventilators. Iron Lung Ventilator Co., Cleveland, O.
Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Alumnaweld—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
A-Lum-O-Aire—Filters. Aluminum Wool Div., Carey Electronic Engineering Co., Springfield, O.
A-Lum-O-Aire—Filters. Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Alundum—Cement, grinders and grinding wheels, refractories and refractory cement. Norton Co., Worcester, Mass.
AluTin—Solder. Eutectic Welding Alloys Corp., Flushing, N. Y.
Amblerex#2—Insulating cement. Keasbey & Mattison Co., Ambler, Pa.
Amchem—Isotopes. American Gas & Chemicals, Inc., Leak-Tec Div., New York, N. Y.
Amco—Protective coatings, welding compounds, solder. American Solder & Flux Co., Philadelphia, Pa.
Amco—Humidifiers, psychrometers. Grinnell Co., Inc., Providence, R. I.
Amco—Control Systems, humidifiers, hygrometers. indicators, meters, nozzles, air conditioning units, psychrometers, valves. American Moistening Co., Providence, R. I.
Amer-Clone—Collectors. American Air Filter Co., Inc., Louisville, Ky.
Amer-glas—Air filters. Bowman Co., D. F., New Albany, Ind.
Amer-glas—Unit filters. American Air Filter Co., Inc., Louisville, Ky.
American—Recorders, manometers, regulators, thermometers, transmitters, wells. Manning, Maxwell & Moore, Inc., Stratford, Conn.
American—Meters. Buffalo Meter Co., Buffalo, N. Y.
American—Heater. Hotstream Heater Co., Cleveland, O.
American AC—Air filters. American Air Filter Co., Inc., Louisville, Ky.
American Hammered—Rings. Koppers Company, Inc., Metal Products Div., Baltimore.
American H/V—Unit Filters. American Air Filter Co., Inc., Louisville, Ky.
American MW—Air filters. American Air Filter Co., Inc., Louisville, Ky.
American-Microsen — Transmitters. Manning, Maxwell & Moore, Inc., Stratford, Conn.
Amerigear—Couplings. American Flexible Coupling Div., Zurn Industries, Inc., Erie, Pa.
Ameritherm—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit.
Amerjet—Collectors. American Air Filter Co., Inc., Louisville, Ky.
Amer-Plate—Tank linings. Amercoat Corp., South Gate, Calif.
Amesteam—Boilers. Ames Iron Works, Inc., Oswego, N. Y.
Aminco—Colorimeters, gage testers, indicator-controllers, indicators, pumps, recorders, regulators, recorder-controllers, relays, viscosimeters. American Instrument Co., Inc., Silver Spring, Md.
Ammonoduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Ampcoflex—Pipe fittings, fume disposal hoods, plastic valves, tanks, ducts and duct fittings, plastic pipe, plastic sheets. Atlas Mineral Products Co., Mertztown, Pa.
Ampcolite—Pipe fittings, plastic pipe. Atlas Mineral Products Co., Mertztown, Pa.
Am-Pe-Co—Centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Amphesive—Adhesives. Atlas Mineral Products Co., Mertztown, Pa.
Amtico—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit.
Amvent—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
Anaconda—Angles, bars, beams, channels and tees, electrodes, fittings, pipe, welding rod, sheets, tubing, valves. American Brass Co., Waterbury, Conn.
Anco—Water treatment. Anderson Chemical Co., Inc., Macon, Ga.
Anco Scale Remover—Compounds, scale removal, treatment. Anderson Chemical Co., Inc., Macon, Ga.
Andrite—Dehydrators. Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anemotherm—Direct reading meters. Anemostat Corp. of America, New York, N. Y.
Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.
Anti-Capillary—Compounds. Eutectic Welding Alloys Corp., Flushing, N. Y.
Anti-Spatter—Welding compounds. Thompson and Co., Oakmont, Pa.
Anti-Spatter—Welding compounds. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Apco—Turbine type pumps, systems. Aurora Pump Div., The New York Air Brake Co., Aurora, Ill.
Apeco—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.
Apex—Analyzers, recorders, indicators. Uehling Instrument Co., Paterson, N. J.
Apexior—Coatings. Dampney Co. of America, Boston, Mass.
Aprilaire—Humidifiers. Research Products Corp., Madison, Wis.
Apsco—Switches, nozzles. April Showers Co., Inc., Washington, D. C.
Apthorp—Nozzles. Boston Machine Works, Inc., Lynn, Mass.
Aqua-Clear—Water treatment. Sudbury Laboratory, Sudbury, Mass.
Aquacooler—Towers, cooling. The Marley Co., Kansas City, Mo.
Aqua-Cushion—Absorbers. Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Aqua-Line—Radiation. York-Shipley, Inc., York, Pa.
Aqua-Saver—Cooling towers. Peerless Products Div., United Cooling Towers, Inc., N. Little Rock, Ark.
Aquastat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Aqua-Tite—Seals. Schwitzer Corp., Indianapolis, Ind.
Aquatone—Treatment, compounds, steam and water. Ampion Corp., Long Island City, N. Y.
Aquatower—Cooling towers. Marley Co., The, Kansas City, Mo.
Aqulux—Water heaters. Johnson Co., S. T., Oakland, Calif.
Arbest—Flanges, humidifiers, nipples, plates, valves. G & H Mfg. Co., Philadelphia, Pa.
Arcaloy—Electrodes. Alloy Rods Co., York, Pa.
Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Arco—Hangers, radiation. American Radiator & Standard Sanitary Corp., New York, N. Y.
Arcoglas—Heaters. American Radiator & Standard Sanitary Corp., New York, N. Y.
Arcoleader-Oil—Boilers. American Radiator & Standard Sanitary Corp., New York, N. Y.
Arcoliner-Oil—Boilers. American Radiator & Standard Sanitary Corp., New York, N. Y.
Arco Sil—Hose, ducts and duct fittings. Arrowhead Products Div., of Federal-Mogul-Bower Bearings, Inc., Long Beach, Calif.
Arcosteel—Heaters. American Radiator & Standard Sanitary Corp., New York, N. Y.
Arctic Circle—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.
Arid Air—Dehumidifiers. Tamms Industries Co., Chicago, Ill.
Arin—Louvers and shutters. Arex Co., Chicago, Ill.
Armaglas—Insulation. Armstrong Cork Co., Lancaster, Pa.
Armalite—Insulation. Armstrong Cork Co., Lancaster, Pa.
Armalox—Wrenches. Armstrong Bros. Tool Co., Chicago, Ill.
Armatemp—Insulating cement. Armstrong Cork Co., Lancaster, Pa.
Ar-Met—Meters. Brooks Rotameter Co., Lansdale, Pa.
Armoflex—Insulation, pipe and tubing. Armstrong Cork Co., Lancaster, Pa.
Armstrong-Bridgeport—Chasers, cutters, pipe cutting oil, reamers, stands, stocks and dies, tools, vises, and wrenches. Capewell Mfg Co., Hartford, Conn.
Aroclor—Heat transfer oil. Monsanto Chemical Co., St. Louis, Mo.
Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Art—Direct radiation, hangers or brackets. National-U. S. Radiator Corp., Johnstown, Pa.
Artic—Refrigerant. E. I. du Pont de Nemours & Co., Electrochemical Dept., Wilmington, Del.
Asbestocel—Boiler, tank & pipe insulation. Johns-Manville, New York, N. Y.
Asbestocite—Boiler & tank insulation. Johns-Manville, New York, N. Y.
Asbestolux—Insulation. North American Asbestos Corp., Chicago, Ill.
Asco—Valves, relays, solenoid and solenoid cells, strainers, switches, panel and control boards. Automatic Switch Co., Florham Park, N. J.
Ashcroft—Gages, cocks, recorders, switches, testers, transmitters. Manning, Maxwell & Moore, Inc., Stratford, Conn.
Aspir-Jet—Nozzles. Thermal Agency, Houston, Tex.
At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.
Athol Unions—Fittings, unions. Leavitt Machine Co., Orange, Mass.
Atlas—Adhesives. Flintkote Co., The, New York, N. Y.
Atlas—Diffusers, grilles, registers. J. B. Smith Co., Philadelphia, Pa.
Atlas—Fans, furnaces, heaters. Tuck-Aire Furnace Co., San Francisco, Calif.
Atlastaflex—Tank linings. Atlas Mineral Products Co., Mertztown, Pa.
Atlastaply—Tank linings. Atlas Mineral Products Co., Mertztown, Pa.
Atlastavon—Tank linings, tanks. Atlas Mineral Products Co., Mertztown, Pa.
Atlastic 77—Cement and compounds. Atlas Mineral Products Co., Mertztown, Pa.
Atlastiseal—Tank linings. Atlas Mineral Products Co., Mertztown, Pa.

Atmos-Therm—Condensers. Rempe Co., Chicago, Ill.
Atom-Arc—Electrodes. Alloy Rods Co., York, Pa.
Atom-Arc DH—Electrodes. Alloy Rods Co., York, Pa.
Atometer—Meters. American Moistening Co., Providence, R. I.
Atomick—Humidifiers, nozzles. Maid-O'-Mist, Inc., Chicago, Ill.
Auto-Airman—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Autolite—Motors, wire, wiring, recorders, thermometers. Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Autolube—Bearings. International Powder Metallurgy, Inc., Ridgway, Pa.
Automaze—Filters. Air-Maze Corp., Cleveland, O.
Auto-Stat—Blue and white print machines. American Photocopy Equipment Co., Chicago, Ill.
Auto-Vent—Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Autronic—Recorders, indicator-controllers, meters, recorder-controllers, regulators. Swartwout Co., Cleveland, O.
Aveco—Valves. Associated Valve & Engineering Co., Chicago, Ill.
Axiflo—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Axivane—Blowers, and fans. Joy Mfg. Co., Pittsburgh, Pa.

B.A.C.—Condensers, oil coolers, cooling towers. Baltimore Aircoil Co., Inc., Baltimore, Md.
BAC—Air conditioning units. Brunner Div. of Dunham-Bush, Inc., Utica, N. Y.
B. B.—Blast gates. Berger Bros. Co., Philadelphia, Pa.
B & B—Heating and air conditioning equipment, fans, louvers & shutters, housings, washers, blower wheels. Bishop & Babcock Mfg. Co., Cleveland, O.
B & C—Plates, valves, unions. Beaton & Corbin Mfg. Co., Southington, Conn.
BCA—Bearings. Bearings Co. of America, Div. of Federal Mogul Bower Bearings, Inc., Lancaster, Pa.
B. & G.—Air eliminators, circulators, coolers, condensers, fittings, heat exchangers, heaters, heating systems, superheaters, temperature regulators, tanks, valves. Bell & Gossett Co., Morton Grove, Ill.
B-H—Insulation. Baldwin-Hill Co., Trenton, N. J.
B-H No. 1—Insulation, insulating cement. Baldwin-Hill Co., Trenton, N. J.
B-H Mono-Kover—Insulation. Baldwin-Hill Co., Trenton, N. J.
B & J—Orifices, pumps, strainers, systems, traps, valves. Barnes & Jones, Inc., Newtonville, Mass.
B & K—Pipe cutting and threading machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
B.O.—Cocks, joints, valves. Bordo Co., Inc., L. J., Glenside, Pa.
B & P Enamel—Enamels and lacquers. Tropical Paint Co., Cleveland, O.
B.7.U.—Concrete. Zonolite Co., Chicago, Ill.
BV—Couplings. Dahl, G. W., Bristol, R. I.
B & W—Boilers, burners, desuperheaters, fuel economizers, refractories, stokers, superheaters. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
B & W—Pipe fittings, flanges, tubes and tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bacite—Insulation, insulating cement. Bird-Archer Co., Philadelphia, Pa.
Baco—Soot destroyer, pumps. Bird-Archer Co., Philadelphia, Pa.
Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.
Baflex—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Balance-trol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
BalanSeal—Valves. Farris Engineering Corp., Palisades Park, N. J.
Ball-Lok—Drives. V-Belt Clutch Co., Los Angeles, Calif.
Ball-Rite—Drills. Oster Mfg. Co., John, Milwaukee, Wis.
Baltograph—Machines and film, X-ray. Balteau Electric Corp., Stamford, Conn.
Baltospot—Machines and film, X-ray. Balteau Electric Corp., Stamford, Conn.
Bank Heat—Burners. Johnson Co., S. T., Oakland, Calif.
Banroc—Pipe insulation. Johns-Manville, New York, N. Y.
Bantam—Valves. Dahl, G. W., Bristol, R. I.
Barcol—Motors, operators. Barber-Colman Co., Rockford, Ill.
Bardex—Hose. Newage Industries, Inc., Jenkintown, Pa.
Barnes—Cutters. Armstrong Bros. Tool Co., Chicago, Ill.
Barnes—Cutters. Erie Tool Works, Erie, Pa.
Bar-O-X—Protective coatings. Truscon Laboratories Div., Devoe & Raynolds Co., Inc., Detroit, Mich.
Basa Hammers—Tools. Greene, Tweed & Co., North Wales, Pa.
Basaltwool—Insulation. Thermo-Sound Products, Div. of Kittell-Lacy, Inc., El Monte, Calif.
Base Ray—Baseboard radiation. Burnham Corp., Irvington, N. Y.
Basic magnesite—Refractories and refractory cement. Basic Inc., Cleveland, O.
Basifrit—Refractories and refractory cement. Basic Inc., Cleveland, O.
Basimix—Refractories and refractory cement. Basic, Inc., Cleveland, O.
Basmor—Heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Bayce-Heet—Radiation. Brown Products Corp., Union, N. J.
Bay State—Belting, packing. Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Beco—Boards, control systems, controllers and starters, relays, switches, tags. Burke Engineering, Los Angeles, Calif.
Beco-Cell—Corrosion treatment, devices, scale removal. Brown-Electro Co., Oklahoma City, Okla.
Behr-Cat—Tape. Norton Co., Worcester, Mass.
Bell-Ex—Ventilators. New York Blower Co., Chicago, Ill.
Bell-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Beloit—Machines, punches, power shears. Hendley & Whittemore Co., Beloit, Wis.
Berkshire—Hangers and supports. Armart Mfg. Co., Pittsfield, Mass.
Bermico—Fiber glass. Brown Co., Boston, Mass.
Bestfelt "Lamino Sponge"—Insulation. Keasley & Mattison Co., Ambler, Pa.
Bestoil—Pipe oil. Oster Mfg. Co., Cleveland, O.
Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bi-Air—Burners. John Zink Co., Tulsa.
Bifurcator—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Big Chief—Refractories and refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Bildrite—Insulation. Insulite Co., Minneapolis, Minn.
Biltin—Heaters. Taco Heaters, Inc., Cranston, R. I.
Bi-Mix—Burners. John Zink Co., Tulsa, Okla.
Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Bison—Boilers. Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Bitumastic—Protective coatings, enamel and lacquers, high temperature paint. Koppers Co., Inc., Pittsburgh, Pa.
Bituplastic—Coatings. Koppers Co., Inc., Pittsburgh, Pa.
Black Baking Japans—Enamels and lacquers. Hilo Varnish Co., Div. of Carpenter-Morton Co., Everett, Mass.
Blakite—Cement. Johns-Manville, New York, N. Y.
Blastaire—Fans, and blower wheels. Revcor Inc., Carpentersville, Ill.
Blazecrete—Refractories. Johns-Manville, New York, N. Y.
Blaze Pruf Silverlume—Paint. Wilbur & Williams Co., Brighton, Mass.
Blend-Air—Ducts and duct fittings, heaters. Coleman Co., Inc., The, Wichita, Kans.
Blenders—Diffusers. Coleman Co., Inc., The, Wichita, Kans.
Blizzard—Air Conditioning units. Palmer Mfg. Corp., Phoenix, Ariz.
Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.
Blu-Cold—Compressors. Lehigh Mfg. Co., Div. of Lehigh Inc., Lancaster, Pa.
Blu-Flame—Burners, heaters. Vacuum Gas Burners, Olean, N. Y.
Blue Circle—Heating boilers. Dunkirk Radiator Corp., Dunkirk, N. Y.
Blue Dot—Benders. Imperial Brass Mfg. Co., Chicago, Ill.
Blue-Line—Burners. Gordon & Piatt, Inc., Winfield, Kans.
Blue-Point—Cutters, Tools, wrenches. Snap-on Tools Corp., Kenosha, Wis.
Blue Ribbon—Headers and nipples. Chicago Nipple Mfg. Co., Oak Park, Ill.
Blue Seal—Solenoids and solenoid coils, valves. Sporlan Valve Co., St. Louis, Mo.
Blue Streak—Dehydrators. Wabash Corp., Chicago, Ill.
Boardman—Pump governors. Locke Regulator Co., Salem, Mass.
Boilergard—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Boiler-Lox—Compounds. Radiator Specialty Co., Charlotte, N. C.
Boiler Solder Seal—Compounds. Radiator Specialty Co., Charlotte, N. C.
Boltaron—Tubing. LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Boltaron 6200—Pipe fittings, plastic pipe, plastic sheets, plastic tubing, valves. H. N. Hartwell & Son, Inc., Boston, Mass.
Bolt-O-Seal—Bolts. Wolfe Co., Franklin C., Culver City, Calif.
Bondmaster—Adhesives. Rubber & Asbestos Corp., Bloomfield, N. J.
Bondwich—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Booster—Units, fuel oil. Cleaver-Brooks Co., Milwaukee, Wis.
Borgana—Compounds, treatments. Strong, Carlisle & Hammond, Cleveland, O.
Bosco—Clay pipe. Bowerston Shale Co., The, Bowerston, O.
Branford—Unions. Malleable Iron Fittings Co., Branford, Conn.
Brassweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Braxon—Compounds, scale removal, water treatment. Anderson Chemical Co., Inc., Macon, Ga.
Brazaloy Fluxes—Solder. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Brazolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.
Breeze—Adsorbers. Barnebey-Cheney Co., Columbus, O.
Breeze Master—Fans. Acme Equipment Co., Muskogee, Okla.
Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.
Breezy-Air—Air conditioning units. Barwick Mfg. Corp., Wichita, Kan.
Brilliant Fire—Heaters. Ohio Foundry & Mfg. Co., Steubenville, O.
Brite Kote—Valves. Hammond Brass Works, Hammond, Ind.
Bronco—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Bronze-Arc C—Electrodes. Alloy Rods Co., York, Pa.
Bronze-Arc Mn—Electrodes. Alloy Rods Co., York, Pa.
Bronze-Chem—Rotary pumps. Eco Engineering Co., Newark, N. J.
Bronze-Chrom—Gas welding rod. Eutectic Welding Alloys Corp., Flushing, N. Y.
Bronzeweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Brule—Incinerators. Goder Incinerator Corp., Blue Island, Ill.
Built-In Thinline—Air conditioning units. General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.
Bulator—Grilles. Hendrick Mfg. Co., Carbondale, Pa.
Bulk-Flo—Conveyors. Link-Belt Co., Chicago, Ill.
Bulldog—Welders. Mid-States Welder Mfg. Co., Chicago, Ill.
Bulldog—Bolts. Polis Mfg. Co., J. D., Chicago, Ill.
Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N.J.
Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Bull Dog—Pulleys and sheaves, belting, tape. Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Bull Dog—Valves. The Carpenter Valve Corp., Cleveland, O.
Bull's Eye—Glasses. Fischer & Porter Co., Hatboro, Pa.
Bullet—Filters. Sealed Unit Parts Co., Inc., Bronx, N. Y.
BunaN—Plastic pipe. Vanton Pump & Equipment Corp., Hillside, N. J.
Burdco—Blades, fans. Burden Co., Alan E., Los Angeles, Calif.
Burkay—Heaters. Smith Corp., A. O., Milwaukee, Wis.
Burks—Pumps. Decatur Pump Co., Decatur, Ill.
Burnham—Pumps. Union Steam Pump Co., Battle Creek, Mich.
Buster—Shears and snips. Lidseen of North Carolina, Inc., Hayesville, N. C.

CBR System—Air sterilizing units. Kewaunee Mfg. Co., Adrian, Mich.
C-E—Boilers, stokers, fuel economizers. Combustion Engineering, Inc., New York.
C-E Heatmaster—Air conditioning units. Combustion Engineering, Inc., New York, N. Y.
C-E Lamont Controlled Circulation—Heating systems. Combustion Engineering, Inc., New York, N. Y.
C-E Raymond—Air separators. Combustion Engineering, Inc., New York, N. Y.

C-E Raymond Flash Dryer—Dryers. Combustion Engineering, Inc., New York, N. Y.
C-E Spreader—Stokers. Combustion Engineering, Inc., New York, N. Y.
C-H—Alarms, blocks, control systems, pilot and signal lights, solenoid and solenoid coils, controllers and starters, heaters, relays, regulators, switches, operators, valves. Cutler-Hammer, Inc., Milwaukee, Wis.
CH—Heaters. McQuay, Inc., Minneapolis, Minn.
CHPE Controller—Regulators. Hays Corp., The, Michigan City, Ind.
C & L—Heaters, torches. Clayton & Lambert Mfg. Co., Louisville, Ky.
CM—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
CMC Aluminum—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
CP—Aftercoolers, clamps, compressors, engines, expanders, grinders and grinding wheels, hoists, machines, pumps, tools. Chicago Pneumatic Tool Co., New York, N. Y.
C & R—Regulators. Automatic Control Co., St. Paul, Minn.
CS—Air conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
CSP—Transformers. Westinghouse Electric Corp., Pittsburgh, Pa.
C.V.—Plastic pipe. Mueller Brass Co., Port Huron, Mich.
CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
CWF—Chillers. Taco Heaters, Inc., Cranston, R. I.
CWG—Compressors. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
CWGE—Compressors. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
Cablestat—Cable. Wiegand Co., Edwin L., Pittsburgh, Pa.
Cadillac—Meters. Central Station Steam Co., Detroit, Mich.
Cafco—Insulation cement. United States Mineral Wool Co., Stanhope, N. J.
Calco—Valves. California Brass Mfg. Co., Los Angeles, Calif.
Cal-Fin—Pipe, tubing, radiation. Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Calktite—Cement and compounds. United States Stoneware Co., New York, N. Y.
Calol—Protective coatings. Standard Oil Co. of California, San Francisco, Calif.
Calorex—Oil burners. W. N. Best Combustion Equipment Co., Inc., Carlstadt, N.J.
Caltemp—Insulation. Fibreboard Paper Products Corp., San Francisco, Calif.
Camomatic—Valves. Belco Industrial Equipment Div., Bogue Electric Mfg. Co., Paterson, N. J.
Campbell—Regulators, controls. Fuel Reduction Corp., Chicago, Ill.
Capacilogs—Temperature recorders. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Capacitrols—Indicator - controllers. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Capillary—Air washers. Clarage Fan Co., Kalamazoo, Mich.
Capillary—Air washers, humidifiers, cooling towers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.
Capitolaire—Furnaces, compressors, radiation, air conditioning units. National-U. S. Radiator Corp., Johnstown, Pa.
CaPlugs—Plugs, caps and closures. Protective Closures Co., Inc., CaPlugs Div., Buffalo, N. Y.
Caposil—Cement, insulation. North American Asbestos Corp., Chicago, Ill.
Caposite—Cement, insulation. North American Asbestos Corp., Chicago, Ill.
Capri—Air conditioning units. Frigid, Inc., Brooklyn, N. Y.
Carbolite—Soot destroyers. Ampion Corp., Long Island City, N. Y.
Carbozite—Coatings. Ohmlac Paint & Refining Co., Long Island City, N. Y.
Careycel—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Cascade—Water heaters. The Cleveland Heater Co., Cleveland, O.
Cash-Acme—Feeders, pipe strainers, regulators, valves. Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cassel—Templates. Graphic Indicator Co., Los Angeles, Calif.
Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.
Cast-Refract—Refractories. Quigley Co., Inc., New York, N. Y.
Catalina—Radiators, electric. Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Catch-All—Dehydrators and filters. Sporlan Valve Co., St. Louis, Mo.
Cathochem—Water treatment. Electro Rust-Proofing Corp., Belleville, N. J.
Causul—Valves. Lunkenheimer Co., Cincinnati, O.
CC Coatings—Protective coatings, paint. Chemical Solvent Co., Birmingham, Ala.
Cell Concrete—Concrete. Dockstader, Inc., S. E., Washington, D. C.
Celoron—Couplings. Continental-Diamond Fibre Corp., Newark, Del.
Cemcoat—Enamels and lacquers. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
Cementseal—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
CenTraVac—Compressors. Trane Co., The, La Crosse, Wis.
Centri-Chem—Centrifugal pumps. Eco Engineering Co., Newark, N. J.
Centripac—Packing. Johns-Manville, New York, N. Y.
Centripeller—Roof ventilators. Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Century—Pipe. Keasbey & Mattison Co., Ambler, Pa.
Century—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.
Ceramiduct—Ducts and duct fittings. Straitsville Brick Co., New Straitsville, O.
Cert-a-bar—Conduits. Stillwater Clay Products Co., The, Cleveland, O.
Certified Climate—Air conditioning units, washers. Parks-Cramer Co., Fitchburg, Mass.
Cesco—Fittings. Columbia Engineering Service Co., Santa Rosa, Calif.
C-Flux—Solder and fluxes. American Solder & Flux Co., Philadelphia, Pa.
Challenger—Hoists. Coffing Hoist Div., Duff-Norton Co., Danville, Ill.
Chamfer Trade—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.
Champ—Non-metal hose. LE-HI Div., Hose Accessories Co., Philadelphia, Pa.
Champion—Furnaces, heaters. National Heater Co., Inc., St. Paul, Minn.
Champion—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Champion—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Chan-All—Pipe storage racks. The Modern Hanger Corp., Cleveland, O.
Charg-A-Can—Refrigerants. American Potash & Chemical Corp., Aerosol & Refrigeration Div., Los Angeles, Calif.
Chemiseal—Seals, gaskets, joints, packing, couplings, shaft. United States Gasket Co., Camden, N. J.
Chem-o-Feeder—Feeders, pumps, water treatment. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chem-O-Shot—Pumps. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chempac—Gaskets, packing. Johns-Manville, New York N. Y.
Chem-Rem—Protective coatings. Speco, Inc., Cleveland, O.
Chesterflex—Wire. Chester Cable Corp., Chester, N. Y.
Chesterflur—Wire. Chester Cable Corp., Chester, N. Y.
Chevron—Packing. Garlock Packing Co., Palmyra, N. Y.
Chex-Spray—Valve bonnet shields. Industrial Products Co., Philadelphia, Pa.
Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago Ill.
Chill Air—Air conditioning units, fans. National Engineering & Mfg. Co., Sedalia, Mo.
Chil-Lator—Coolers. McQuay, Inc., Minneapolis, Minn.
CHILL VACTOR—Steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N Y.
Chimney Crown—Caps. Coleman Co., Inc., The, Wichita, Kans.
Chimney Sweep—Chemical destroyers. Coughlan Co., G. N., West Orange, N. J.
Chinook—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chlorimet—Heat exchangers, fans, fittings, heaters, pipe, pumps, nozzles, valves. Duriron Co., Inc., The, Dayton, O.
Chlorinizer—Chlorinators, and treatment. Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chlor-O-Feeder—Feeders, pumps. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chlor-O-Mite—Pumps, water treatment. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chore Boy—Incinerators. Incinerator Products, Inc., Detroit, Mich.
Chore Boy—Burners. Standard Fuel Engineering Co., Detroit, Mich.
Chromalox—Heat exchangers, conductors and panels, preheaters, pipe thawers, fuel oil units, dryers, indicator-controllers, heating systems, radiation, superheaters, thermostats, switches, ventilators, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Chrome—Packing. Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Chrome Lock—Gaskets, tape. Products Research Co., Los Angeles, Calif.
Chromend—Electrodes. Arcos Corp., Philadelphia, Pa.
ChromiCoat—Protective coatings. Oakite Products, Inc., New York, N. Y.
Chromix—Refractories. Quigley Co., Inc., New York, N. Y.
Chronoflo—Flow meters, gages, recorders. Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Chronometer—Valves. Defender Instrument & Regulator Co., Boody, Ill.
Cinch—Expansion bolts. National Lead Co., New York, N. Y.
Circu-Ray—Heaters. Temco, Inc., Nashville, Tenn.
Clair-Tex—Connections. St. Clair Rubber Co., Detroit, Mich.
Clamp-A-Leak—Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.
Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Cla Rite—Filters. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Claymont—Steel pipes. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Clean-Flo—Motors. Allis Co., Louis, The, Milwaukee, Wis.
Clean Right—Soot destroyers. General Filters, Inc., Novi, Mich.
Clear-stream—Treatment. Reynolds Water Conditioning Co., Detroit, Mich.
Clearstream—Pipe fittings; plastic pipe; plastic tubing. Yardley Plastic Co., Columbus, O.
Clearview—Gages. Boston Machine Works Co., Lynn, Mass.
Cleveland—Heaters. Hotstream Heater Co., Cleveland, O.
Clevite—Bearings. Cleveland Graphite Bronze Co., Div. of Clevite Corp., Cleveland, O.
Cliff—Boilers, water heaters. Terre Haute Boiler Works Co., Terre Haute, Ind.
Climate Changer—Unit air conditioners. Trane Co., The, LaCrosse, Wis.
Climate-Lab—Test chambers. American Instrument Co., Inc., Silver Spring, Md.
Climatrol—Boilers, furnaces, heaters, fans, air conditioning units. Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.
Climax—Governors, regulators, strainers, valves. Black, Sivalls & Bryson Inc., Kansas City, Mo.
Clipper—Fans. Trade-Wind Motorfans, Inc., Rivera, Calif.
Clipper—Refractories and refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Clipper Seals—Packing seals. Johns-Manville, New York.
Clorodine—Boiler cleaning compounds. American Chemical Paint Co., Ambler, Pa.
Closin—Bolts. Star Expansion N.Y., Inc., New York, N. Y.
Coal-Pak Automatic—Boilers. International Boiler Works Co., The, East Stroudsburg, Pa.
Cocheo—Belting. Williams & Son, I. B., Dover, N. H.
Coeco—Controls and dampers. Combustion Equipment Co., Moline, Ill.
Cold Generator—Chillers. Trane Co., The, La Crosse, Wis.
Cold Plate—Coils, condensers, coolers. Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N. Y.
Color-Port—Gages. Yarnall-Waring Co., Philadelphia, Pa.
Coltemp—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.
Combi-Matic—Burners. Power-Flame Div., Inc., Grandview, Mo.
Combustioner—Humidifiers. Steel Products Engineering Co., Springfield, O.
Comet—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Comfort Control—Temperature regulators. Bell & Gossett Co., Morton Grove, Ill.
Comfortaire—Air conditioning units. American Coils Co., Farmingdale, N. J.
Comfortline—Baseboard radiation. National-U.S. Radiator Corp., Johnstown, Pa.
Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.
Cominco—Insulating cement, insulation. United States Mineral Wool Co., Stanhope, N. J.
Commercial-Aire—Heaters. Mammoth Furnace Co., Minneapolis, Minn.
Compact Scotch—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Compak—Boilers. International Boiler Works Co., The, East Stroudsburg, Pa.

Compar—Plastic tubing. Resistoflex Corp., Roseland, N. J.

Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.

Compound Lever—Hand shears and snips. Bartlett Mfg. Co., Detroit, Mich.

Conco—Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.

Condenseal—Pipe insulation, tubing. Jarrow Products, Chicago, Ill.

Condor—V-belts, hose, pipe. Raybestos-Manhattan, Inc., Passaic, N. J.

Condo-Vac—Vacuum pumps. Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.

Conflex—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.

Coni-Vane—Ventilators. Allen Cooler & Ventilator, Inc., Rochester, Mich.

Connect-O-Matic—Pipe couplings. Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

Conomatic—Filters. Continental Air Filters, Inc., Louisville, Ky.

Conomotors—Duct and valve operators. Conoflow Corp., Subsidiary of Walworth Co., Philadelphia, Pa.

Conseco—Water chillers, oil coolers, heat exchangers, filters, headers, water heaters, joints, preheaters, separators, superheaters. Condenser Service & Engineering Co., Inc., Hoboken, N. J.

Consolaire—Air Conditioning Units. Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.

Consolidated—Valves. Manning, Maxwell & Moore, Inc., Stratford, Conn.

Constellation Line—Arc welders. Trindl Products, Ltd., Chicago, Ill.

Con-Tac-Ton—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Continental—Boilers. Boiler Engineering & Supply Co., Phoenixville, Pa.

Continuous Flow—Heating Systems. Webster & Co., Warren, Camden, N. J.

Control-by-the-Weather—Heating Control. Webster & Co., Warren, Camden, N. J.

Convector—Humidifiers. Maid-O'-Mist, Inc., Chicago, Ill.

Converto—Roof ventilators. Ammerman Co., Inc., Minneapolis, Minn.

Conveyoflo—Conveyors. Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.

Conveyor—Pulleys and Sheaves. The American Pulley Co., Philadelphia, Pa.

Cool-A-Matic—Air conditioning units. Automatic Corp., St. Louis, Mo.

Coolero—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N.Y.

Coolex—Water treatment. Anderson Chemical Co., Inc., Macon, Ga.

Coolite—Windows. Mississippi Glass Co., St. Louis, Mo.

Coolmaster—Unit coolers. Kramer Trenton Co., Trenton, N. J.

Cool-Mate—Air conditioning units. Weil-McLain Co., Michigan City, Ind.

Coolube—Oil. Warren Refining & Chemical Co., The, Cleveland, O.

Con-R-Loy—Sheets. Wheeling Corrugating Corp., Wheeling, W. Va.

Cop-R-Loy—Sheets, pipe. Wheeling Steel Corp., Wheeling, W. Va.

Copr-fibre—Insulation. Forty-Eight Insulations, Inc., Aurora, Ill.

Copr-Tube—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

Copyflex—Blueprint machine. Bruning Co., Inc., Charles, Chicago, Ill.

Cordan—Leather belting and V belts. Sikes Co., S. R., Minneapolis, Minn.

Cor-In Galvanode—Electrolytic devices. Rotometals, San Francisco, Calif.

Cork-Flex—Bases and pad, noise elimination for cooling towers. Vibration Mountings, Inc., Corona, N. Y.

Cork-Rib—Bases and pad. Vibration Mountings, Inc., Corona, N. Y.

Coromat—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.

Corox—Heaters. Westinghouse Electric Corp., Pittsburgh, Pa.

Corrocote—Coatings. Chemical Coatings & Engineering Co., Edgemont, Pa.

Corrodicide—Water treatment, compounds. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Corrodine—Compound and water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Corson-Cerveny Micro-Bellows Pump—Feeders. Research Appliance Co., Allison Park, Pa.

Cottrell—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.

Counterflo—Furnaces. Dravo Corp., Machinery Div., Pittsburgh, Pa.

Covetong—Torches. Lincoln Electric Co., The, Cleveland, O.

Cox—Water heaters. O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.

Coxe—Stokers. Combustion Engineering, Inc., New York, N. Y.

Cozy—Wall heaters. Advance Furnace Co., Wichita, Kans.

Crag—Treatment. Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.

Crescent—Valves. Powell Co., Wm., The, Cincinnati, O.

Cresline—Plastic fittings, pipe, tubing. Crescent Plastics, Inc., Evansville, Ind.

Crest—Water heaters. Day & Night Mfg. Co., Monrovia, Calif.

Crispin—Air eliminators, pipe joints, valves. Multiplex Mfg. Co., Berwick, Pa.

Croloy—Pipe, pipe fittings, flanges, tubes, and tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.

Cross-Flo—Dehydrators. Remco, Inc., Zelienople, Pa.

Cryscoat—Protective coatings. Oakite Products, Inc., New York, N. Y.

Crystal—Protective coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.

Crystolon—Refractories and refractory cement, furnace cement. Norton Co., Worcester, Mass.

Cummins—Drills. Oster Mfg. Co., John, Milwaukee, Wis.

Cupralum—Coils and panels. Knapp Mills, Inc., Long Island City, N. Y.

Curtiss—Air conditioning units. Kleer Kleen Mfg. Co., Hayward, Calif.

Cushioned Power—Valves. White-Rogers Co., St. Louis, Mo.

Cutno—Packing. Greene, Tweed & Co., North Wales, Pa.

Cut-O-Matic—Flame cutters. National Cylinder Gas Co., Chicago, Ill.

Cut Trode—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.

Cyclo-Core—Drills. New England Carbide Tool Co., Inc., Medford, Mass.

Cyclon—Plastic tubing. Munray Products, Inc., Cleveland, O.

Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.

Cyclone—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Cyclonetic—Burners. Webster Engineering Co., Tulsa, Okla.

Cyclothene—Plastic tubing. Munray Products, Inc., Cleveland, O.

Cyclo-Twist—Drills. New England Carbide Tool Co., Inc., Medford, Mass.

Cycoil—Dust Collectors. American Air Filter Co., Inc., Louisville, Ky.

DFN—Dehydrators, filters, sight glasses, mufflers, strainers. McIntire Co., The, Livingston, N. J.

D.I.P.—Bends, insulation, conduit, pre-insulated pipe. Durant Insulated Pipe Co., E. Palo Alto, Calif.

D.I.P.—Insulation, conduit, pre-insulated pipe. Durant Insulated Pipe Co., Inc., Williamstown, N. J.

DRC-Blue Circle—Baseboard radiation. Dunkirk Radiator Corp., Dunkirk, N. Y.

DRH Hanger—Absorbers, hangers. Vibration Mountings, Inc., Corona, N. Y.

DX—Softeners. Stover Water Softener Co., St. Charles, Ill.

Dacor—Adsorbers, air filters. Barnebey-Cheney, Inc., Columbus, O.

Daffinaire—Humidifiers HERRmidifier Co., Neffsville, Pa.

Dall—Nozzles. Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.

Dampermatic—Baseboard radiation. Beacon-Morris Corp., Boston, Mass.

Damperset—Regulators. Elgen Mfg Co., Long Island City, N.Y.

Danco—Filters, pipe fittings, plastic pipe, tubing. Danielson Mfg. Co., Danielson, Conn.

Darcova—Packing. Sims Pump Valve Co., Hoboken, N. J.

Dart—Unions, fittings. Fairbanks Co., The, New York, N. Y.

Day-Nite Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Day-Steel—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.

Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.

Debanode—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.

Debecote—Coatings. Debevoise Co., The, Brooklyn, N. Y.

Deep Bed—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Deflectrol—Turning vanes. Barber-Colman Co., Rockford, Ill.

Defrostolator—Hot gas defrosting systems. Tenney Engineering, Inc., Union, N. J.

Dehydrators—Dehumidifiers. Selas Corp. of America, Dresher, Pa.

Dekoron—Protective coatings, tubing. Moore & Co., Samuel, Mantua, O.

Dekoron E-Z—Fittings. Moore & Co., Samuel, Mantua, O.

Delaytrol—Valves. Webster Electric Co., Racine, Wis.

Delta—Steel boilers. Zingham Co., William C., Chicago, Ill.

Demi—Valves. Dahl, G. W., Bristol, R. I.

Demi-Purge—Meters. Dahl, G. W., Bristol, R. I.

Demon Air-Set—Refractories. Plibrico Co., Chicago, Ill.

Densitron—Alarms. Ripley Co., Inc., Middletown, Conn.

Deodorite—Air freshening compounds. Barnebey-Cheney Co., Columbus, O.

Deoxidine—Cleaning compounds. American Chemical Paint Co., Ambler, Pa.

Dereka—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.

Desco—Blower wheels. Denbo Engineering and Sales, Inc., Indianapolis, Ind.

Design-Air—Diffusers. Krueger Air Conditioning Co., Tucson, Ariz.

De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.

Detect-A-Fire—Controls. Fenwal Inc., Ashland, Mass.

Detroit—Traps. Nason Co., Clarkston, Mich.

Dexion—Angles, bars, beams, channels and tees, racks, tank stands. Acme Steel Co., Chicago, Ill.

Dexter—Valve reseaters, air separators, steam traps. Leavitt Machine Co., Orange, Mass.

Di-Acro—Benders, brakes, machines, punches, shears. O'Neil-Irwin Mfg. Co., Lake City, Minn.

Dial-A-Speed—Motors. Brown-Brockmeyer Co., Inc., Dayton, O.

Diamond—Compounds, enamels and lacquers. Thompson and Co., Oakmont, Pa.

Diamond—Valves. Imperial Brass Mfg. Co., Chicago, Ill.

Diamond—Adsorbers, filters, water treatment. Oshkosh Filter & Softener Co., Oshkosh, Wis.

Diamond Fibre—Gaskets. Continental Diamond Fibre Corp., Newark, Del.

Diamond H—Switches, thermostats, relays. Hart Mfg. Co., Hartford, Conn.

Diaphlex—Bellows, relays, solenoids, and switches. Cook Electric Co., Chicago, Ill.

Dieselite—Compounds. Metropolitan Refining Co., Inc., Long Island, N. Y.

Diffusaire—Diffusers. Hart & Cooley Mfg. Co., Holland, Mich.

Dilecto—Plastic pipe and tubing. Continental Diamond Fibre Corp., Newark, Del.

Dill Dust Spot Tester—Tester, dust spot. Research Appliance Co., Allison Park, Pa.

Dimetcote—Coatings. Amercoat Corp., South Gate, Calif.

Directrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Distributor—Radiation. Kehm Corp., The, Chicago, Ill.

Divco—Fittings, coils, pipe and tubing, sheets, plugs, solder, valves. Division Lead Co., Summit, Ill.

Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.

Dixisteel—Angles, bars, beams, channels and tees. Atlantic Steel Co., Atlantic, Ga.

Do-All—Drills, tools. Wodack Electric Tool Corp., Chicago, Ill.

Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.

Do-Mor-Ad—Saw tools. Pioneer Tool Co., Racine, Wis.

Dorex—Adsorbers. Connor Engineering Corp., Danbury, Conn.

Doro-Chrome—Benders, cutters, tools, wrenches. Duro Metal Products Co., Chicago, Ill.

Double Check—Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.

Double Diamond—Hygrometers, regulators, psychrometers, thermometers. H. B. Instrument Co., Philadelphia, Pa.

Double-Flow—Cooling towers. Marley Co., The, Kansas City, Mo.

Double Retort Stoker—Stokers. Detroit Stoker Co., Monroe, Mich.

Double-Seal—Copper tube fittings. Hays Mfg Co., Erie, Pa.

Doubleton—Pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DovRloy—Steel sheets. Reeves Steel & Mfg. Co., Dover, O.

Dowflake—Dehumidifiers. Dow Chemical Co., The, Midland, Mich.

Dowmetal—Sheets, tubing, welding rod. Dow Chemical Co., Midland, Mich.

Downblast—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Downflow—Unit heaters. McQuay, Inc., Minneapolis, Minn.

Dowtherm—Process heating systems. Dow Chemical Co., The, Midland, Mich.

Draft-A-Justor—Draft controls. Preferred Utilities Mfg. Corp., New York, N. Y.

Draftender—Regulators. Penn Controls, Inc., Goshen, Ind.
Draft King—Caps, vent flue. Wood Mfg. Co., A. R., Luverne, Mich.
Draft Korektor—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Draft-O-Stat—Barometric controls. Hotstream Heater Co., Cleveland, O.
Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Draftrite—Gages. Cole-Sewell Engineering Co., St. Paul, Minn.
Draft Stabilizer—Draft controls. Boston Machine Works, Co., Lynn, Mass.
Dragnet—Leak detectors, testers. Universal Controls Corp., Dallas, Tex.
Dragon—Vacuum cleaners, dust collectors. Empire Chemical Products Co., Newark, N.J.
Drainator—Traps. Coe Mfg. Co., Painesville, O.
Drain-Dri—Sump pumps. Yeomans Bros. Co., Melrose Park, Ill.
Draintrol—Traps. Schaub Engineering Co., Fred H., Chicago, Ill.
Dramalloy—Shears and snips. Diamond Calk Horseshoe Co., Duluth, Minn.
Dricon—Condensers. Recold Corp., Los Angeles, Calif.
Dri-Fan—Condensers, cooling towers. Recold Corp., Los Angeles, Calif.
Drifreeze—Dehydrant and acid neutralizer, dehydrators. Berna Corp., Garwood, N. J.
Driline—Dehumidifiers. Desomatic Products, Inc., Falls Church, Va.
Dri-Pipe—Insulation. Mystik Adhesive Products, Inc., Chicago, Ill.
Drip-pump—Pumps. Peerless of America, Inc., Chicago, Ill.
Drive-IT—Hangers and supports, fasteners. Omark Industries, Portland, Ore.
Drycid—Treatment. Oakite Products, Inc., New York, N. Y.
Dry-Eye—Dehydrators. Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.
Dryfol—Insulation. Reflectal Corp. Subsid., Borg-Warner Corp., Chicago, Ill.
Drygalv—Protective coatings. American Solder & Flux Co., Philadelphia, Pa.
Dry-Ice—Refrigerants. Pure Carbonic Co., Div. of Air Reduction Co., Inc., New York.
Drymaster—Dehumidifiers. Dryomatic Corp., Alexandria, Va.
Dryvin—Expansion bolts. Star Expansion N. Y., Inc., New York, N. Y.
Dual Adjusta-Flo—Valves. Sullivan Valve & Engineering Co., Butte, Mont.
Dualaire—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Dualarc—Arc Welders. Electric Arc, Inc., Newark, N. J.
Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.
Dual-Dial—Gages. Rochester Mfg. Co., Inc., Rochester, N. Y.
Dual-A-Fire—Burners. Automatic Corp., St. Louis, Mo.
Dualene—Fuel oil treatment. Allen Co., Robert G., Mechanicsville, N. Y.
Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.
Dualvector—Air conditioning units. Kritzer Radiant Coils, Inc., Batavia, Ill.
Dualvent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Dubl-Dome—Heat insulating windows. Pam Co., The, Portland, Ore.
Duboth—Boiler water treatment, compounds. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Duclone—Dust collectors. Ducon Co., The, Mineola, N. Y.
Duco—Enamels and lacquers. du Pont de Nemours & Co., E. I., Finishes Div., Wilmington, Del.
Ductatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Ducturns—Vanes. Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Ductype—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dulux—Enamels and lacquers. du Pont de Nemours & Co., E. I., Finishes Div., Wilmington, Del.
Dum Dum—Sealing compounds. Arco Co., The, Cleveland, O.
Duo Blo—Air heaters. American Furnace Co., St. Louis, Mo.
Duo Equalizing HypTor—Pipe joints. Zallea Brothers, Wilmington, Del.
Duonetic—Gas and oil burners. Webster Engineering Co., Tulsa, Okla.
Duo-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Duotrol—Regulators, indicators, switches. Automatic Control Co., St. Paul, Minn.
Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Duplex—Pipe cutting machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Duplex Twin Rail—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Durable—Flanges, pipe. U. S. Valve & Mfg. Co., S. San Francisco, Calif.
DuraBilt—Registers. Auer Register Co., Cleveland, O.
Dura-Flex—Registers. Auer Register Co., Cleveland, O.
Duraflex—Stokers. Canton Stoker Corp., Canton, O.
Dura-Line—Registers. Auer Register Co., Cleveland, O.
Duranite—Enamels and lacquers. Glidden Co., Nubian Div., Chicago, Ill.
Duratex—Adhesives and protective coatings, solvent. National Pipe Coating, Inc., Huntington Park, Calif.
Durco—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Durcopump—Fans, fittings, heaters, exchangers, nozzles, pumps, pipe, valves. Duriron Co., Inc., Dayton, O.
Durethene—Vapor barriers. Koppers Co., Inc., Pittsburgh, Pa.
Durex—Bearings. Moraine Products Div., General Motors Corp., Dayton, O.
Durichlor—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Duridine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Durimet—Fans, fittings, heaters, exchangers, nozzles, pumps, pipe, valves. Duriron Co., Inc., Dayton, O.
Duro-Blade—Regulators. Duro-Dyne Corp., New Hyde Park, L. I., N. Y.
Durolite—Insulation. Insulite Div., Minnesota & Ontario Paper Co., Minneapolis, Minn.
Duro-Metal-FAB—Duct connections, ducts and duct fittings. Duro-Dyne Corp., New Hyde Park, L. I., N. Y.
Durospead—Heads. Grinnell Co., Inc., Providence, R. I.
Duro-Vane-Rail—Vanes. Duro-Dyne Corp., New Hyde Park, L. I., N. Y.
Dur-X—Plastic fittings and pipes. Franklin Plastics, Inc., Franklin, Pa.
Dustay—Filters. Air-Maze Corp., Cleveland, O.
Dust King—Dust collectors. Dust Filter Co., Chicago, Ill.
Dustkop—Dust collectors. Aget Mfg. Co., Adrian, Mich.
Dust Master—Dust collectors. Bannister Co., Inc., Cambridge, Mass.
Dustronic—Air filters. Radex Corp., Chicago, Ill.
Dust-Stop—Air Filters. Owens-Corning Fiberglas Corp., Toledo, O.
Dustube—Dust collectors. Wheelabrator Corp., Mishawaka, Ind.
Dutch Boy—Solder, protective coatings, enamels and lacquers. National Lead Co., New York, N. Y.
Duxbak—Leather belting and packing. Schieren Co., Chas. A., Camden, N. J.
Dux-Sulation—Insulation. Grant Wilson, Inc., Chicago, Ill.
Dy-Chek—Dye penetrant. Turco Products, Inc., Los Angeles, Calif.
Dyanfan—Roof ventilators. Penn Ventilator Co., Philadelphia, Pa.
Dylan—Plastics, powders and resins. Koppers Co., Inc., Pittsburgh, Pa.
Dylene—Plastics, powders and resins. Koppers Co., Inc., Pittsburgh, Pa.
Dylite—Plastics, powders and resins. Koppers Co., Inc., Pittsburgh, Pa.
Dynaflow—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dyna-Line—Electric motors, reducers. Brown-Brockmeyer Co., Inc., Dayton, O.
Dyn-A-Matic—Water softeners. Modern Div., George Getz Corp., Rockford, Ill.
Dyna-Pac—Air conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
Dynapump—Circulators, pumps. Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Dyne-Aire—Heaters. American Foundry & Furnace Co., Bloomington, Ill.
Dynetic—Gas burners. Webster Engineering Co., Tulsa, Okla.
Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.
Dyno-Mite—Drills. Millers Fall Co., Greenfield, Mass.

E B Weld Insert—Rings. Arcos Corp., The, Philadelphia, Pa.
E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.
E C & M—Motor controllers and starters, switches. Electric Controller & Mfg. Co., Div. of Square D Co., Cleveland, O.
EFM-Fire Jet—Conveyors. Electric Furnace-Man, Inc., Emmaus, Pa.
EFR—Meters. Hays Corp., The, Michigan City, Ind.
E-Cell—Air filters. American Air Filter Co., Inc., Louisville, Ky.
EKCCO—Fans. E. K. Campbell Co., Kansas City, Mo.
E-Klean—Air filters. American Air Filter Co., Inc., Louisville, Ky.
E-Matic—Air filters. American Air Filter Co., Inc., Louisville, Ky.
EMD—Blowers. L. J. Wing Mfg. Co., Linden, N. J.
EMS—Compounds, detectors, destroyers, feeders, solvent, water filters, scale removal, water softeners, treatment. Smith Chemical Co., E. W., La Puente, Calif.
E-PL—Air filters. American Air Filter Co., Inc., Louisville, Ky.
ES—Sheets. Eastern Stainless Steel Corp., Baltimore, Md.
E-Z—Registers, regulators, hangers and supports. Acme Mfg. Co., Philadelphia, Pa.
E.Z.—Hangers or brackets, Inserts. Healey Ruff Co., St. Paul, Minn.
E-Z—Cutters. Collins Machinery Corp., Los Angeles, Calif.
EZ Code—Electric wire. Westline Products Div. of Western Lithograph Co., Los Angeles, Calif.
E-Z-On—Regulators. Gerett Corp., M. A., Milwaukee, Wis.
E-Z See—Glasses. Remco, Inc., Zelienople, Pa.
Easy-Flo—Solder. Handy & Harman, New York, N. Y.
Easy-Wrap—Protective coatings, pipe and tubing insulation, pipe wrap. Rhopac, Inc., Skokie, Ill.
Ebko—Bends, conduit, preheaters, exchangers, pipe, systems, leak testers. Kaiser Co., E. B., Glenview, Ill.
Econ-O-Fab—Duct connections, ducts and duct fittings. Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Econofeed—Pumps, systems. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Econoflow—Regulators. Smith Welding Equipment Corp., Minneapolis, Minn.
Econ-O-Flow—Furnaces. Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Econ-O-Matic—Motor bases. American Pulley Co., The, Philadelphia, Pa.
Economist—Boilers. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Economite—Commercial and industrial gas burners. Mid-Continent Metal Products Co., Chicago, Ill.
Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.
Economo—Burners. Dalzen Mfg. Co., St. Clair, Mich.
Economy—Unit ventilators. Arex Co., Chicago, Ill.
Econostat—Heating systems. Barber-Coleman Co., Rockford, Ill.
Econotherm—Boilers. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Econovent—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
EDCO—Heaters. Cauhorn Distributing Co., Detroit, Mich.
Edgeseal—Air filters. Wilson & Co., Inc., Chicago, Ill.
Edgetallic—Gaskets. Darcoid Co., Inc., New York, N. Y.
Effico—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Ejectopump—Pumps. Ferro Corp., Cleveland, O.
Elastic Metallic—Packing. Chesterton Co., A. W., Everett, Mass.
Elastic Porcelain—Tank linings. Porce-Lin Tank Lining Co., Detroit, Mich.
Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.
Elaterite—Coatings. Ohmlac Paint & Refining Co., Inc., Long Island City, N. Y.
Elbolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.
Electric—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.
Electric Trimline Baseboard—Radiators. Vulcan Radiator Co., Hartford, Conn.
Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electroflo—Valves. Hays Mfg. Co., Erie, Pa.
Electro-Hot—Heaters. Red Spot Electric Co., Tacoma, Wash.
Electromaze—Air filters. Air-Maze Corp., Cleveland, O.
Electro-Mesurflo—Valves. Hays Mfg. Co., Erie, Pa.
Electromite—Valves. Hays Mfg. Co., Erie, Pa.
Electro-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.
Electroweld—Welders. Electric Arc, Inc., Newark, N. J.
Electro-Wind—Ventilators. Allen Cooler & Ventilator Inc., Rochester, Mich.

Flexzorber—Hose. Finn & Company, Inc., T. R., Hawthorne, N. J.
Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J.
Gear-Draulic—Trenching machines. Auburn Machine Works, Inc., Auburn, Neb.

Electrunite—Stainless steel tubing and pipe, tubing benders. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Elesco—Superheaters. Combustion Engineering, Inc., New York, N. Y.
Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.
Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.
Elgin—Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.
ElKoloy—Welders. P. R. Mallory & Co., Inc., Indianapolis, Ind.
ELKonite—Welders. P. R. Mallory & Co., Inc., Indianapolis, Ind.
ELKonium—Welders. P. R. Mallory & Co., Inc., Indianapolis, Ind.
Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Emd-Com—Blowers. Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Empire—Refractories and refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Empire Mallets—Tools. Greene, Tweed & Co., North Wales, Pa.
Enamelite—Coatings. Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Enco—Burners, regulators, registers, combustion control systems, fueloil units. Engineer Co., New York, N. Y.
Endo—Air dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Enduro—Hose. Continental Rubber Wks., Erie, Pa.
Enduro—Steel tubing, pipe. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Enduro#300—Unions. Jefferson Union Co., Inc., Lexington, Mass.
Entrained Combustion—Gas Burners. Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Equalizer—Deaerators, feeders, systems, traps. Acker Corp., Meridian, Miss.
Equatemp—Balancing valves. Ohio Brass Co., Mansfield, O.
Equa-Trol—Valves, manifolds and headers. Hi-Flow Products, Inc., Copiague, N. Y.
Equavalve—Pipe fittings & Valves. Hi-Flow Products, Inc., Copiague, N. Y.
Eraydo—Zinc sheets. Illinois Zinc Co., Div. of Hydrometals, Inc., Chicago, Ill.
Ermeto—Steel tube fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Ermeto—Fittings. Weatherhead Co., The, Ft. Wayne Div., Ft. Wayne, Ind.
Eroduct—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Esco—Fittings, flanges, nipples, pipe, exchangers. Electric Steel Foundry Co., Portland, Ore.
Esco Spuncast—Pipe, tubing. Electric Steel Foundry Co., Portland, Ore.
Escon—Electrical relays. Electro-Switch & Controls, Inc., Culver City, Calif.
Esso—Heaters, air conditioning units. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Esso Bond—Refractories. Ramtite Co., The, Chicago, Ill.
Eternium—Protective coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Eutec-Arc—Arc welders. Eutectic Welding Alloys Corp., Flushing, N. Y.
EuteChron—Welding electrodes, gas welding rod. Eutectic Welding Alloys Corp., Flushing, N. Y.
Eutec Rod—Rods, solder. Eutectic Welding Alloys Corp., Flushing, N. Y.
Eutec-Tin-Weld—Solder. Eutectic Welding Alloys Corp., Flushing, N. Y.
Eutecto Film—Gas welding rod. Eutectic Welding Alloys Corp., Flushing, N. Y.
Eutecto-Mask—Compounds. Eutectic Welding Alloys Corp., Flushing, N. Y.
Eutector Flux—Welding compounds. Eutectic Welding Alloys Corp., Flushing, N. Y.
EutecTorch—Torches, welding and cutting apparatus. Eutectic Welding Alloys Corp., Flushing, N. Y.
EutecTrode—Welding electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.
EVACTOR—Heaters and pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evanaction—Valves. Taylor Instrument Companies, Rochester, N. Y.
Evenflo—Air filters. Hadley Products Co., Inc., Marietta, O.
Ever Clean Boiler Process—Compounds. North American Mogul Products Co., The, Cleveland, O.
Eveco—Controls. Empire Ventilation Equipment Co., Long Island City, N. Y.
Everbrite—Paint. Warren Refining & Chemical Co., The, Cleveland, O.
Everjet—Coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Ever Ready—Holders and files. Geneva Mfg. Co., South Elgin, Ill.
Evolene—Treatmeut. Berna Corp., Garwood, N. J.
Excel 250#—Unions. Jefferson Union Co., Inc., Lexington, Mass.
Exon—Plastics, powders and resins. Chemical Sales Div., Firestone Plastics Co., Pottstown, Pa.
Expand-R-Strap—Fasteners. Gerrard & Co., A. J., Melrose Park, Ill.
Expelsor—Ejectors. Yeomans Bros. Co., Melrose Park, Ill.
Explosimeter—Leak detectors. Mine Safety Appliances Co., Pittsburgh, Pa.
External—Water heaters. Taco Heaters, Inc., Cranston, R. I.
Extra Dry Esotoo—Refrigerants. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Indicators. Reliance Gauge Column Co., Cleveland, O.
Ez-Arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb.
Ezkleen—Filters. Research Products Corp., Madison, Wis.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.

F & E—Stokers, and incinerators. Flynn & Emrich Co., Baltimore, Md.
FS—Bellows. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Fab-Ric—Connections. Cain Mfg. Co., Birmingham, Ala.
Fabri-Flex—Bases and pads, noise elimination for cooling towers. Vibration Mountings, Inc., Corona, N. Y.
Fabrikated—Grilles, registers. Independent Register Co., Cleveland, O.
Faceweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Fairco Braze—Valves. Fairbanks Co., The, New York, N. Y.
Fan-Air—Gas burners. Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Fanaire—Diffusers, registers. Auer Register Co., Cleveland, O.
Fanjet—Systems. Muellermist Irrigation Co., Maywood, Ill.
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
FasFill—Connectors. Scully Signal Co., Melrose, Mass.
Fashion—Thermostats. White-Rodgers Co., St. Louis, Mo.
Faslite—Gas pilots. Scully Signal Co., Melrose, Mass.
Fast's—Couplings. Koppers Company, Inc., Metal Products Div., Baltimore, Md.
FauceHot—Heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Favorite—Ratchet wrenches. Greene, Tweed & Co., North Wales, Pa.
Featherfin—Heating and cooling surface, unit coolers. Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Featherweight—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Featherweight—Unit heaters. Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Featherweight Champ—Pipe cutting and threading machines, pipe vise stands. Oster Mfg. Co., Cleveland, O.
Federal—Filters. Wood Mfg. Co., A. R., Luverne, Minn.
Feedrator—Chemical feeders. Fischer & Porter Co., Hatboro, Pa.
Fel-Pro—Gaskets, packing. Felt Products Mfg. Co., Chicago, Ill.
Felt Grip—Bases and pads. Vibration Mountings, Inc., Corona, N. Y.
Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Beverly, Mass.
Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.
Ferro-Therm—Insulation. American Flange & Mfg. Co., Inc., New York, N. Y.
Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Fibercast—Plastic pipe. Youngstown Sheet & Tube Co., Youngstown, O.
Fiberglas—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Fiber Glass—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Fiberlite—Insulation. Insulite Co., Minneapolis, Minn.
Fibrocel—Pipe insulation. Johns-Manville, New York, N. Y.
Fieldlink—Fittings. LaFavorite Rubber Mfg. Co., Hawthorne, N. J.
Fil-Thru—Gages. Applied Mechanics Co., Boston, Mass.
Filtr-Aire—Filters. Peden Equipment Co., Houston, Tex.
Filtrex—Filters. Drico Industrial Corp., Passaic, N. J.
Fin-Flex—Registers. Auer Register Co., Cleveland, O.
Finger Strap—Fasteners. Gerrard & Co., A. J., Melrose Park, Ill.
Finnflex—Bases, hangers. Finn & Co., Inc., T. R., Hawthorne, N. J.
Fin Ray—Radiation. National-U.S. Radiator Corp., Johnstown, Pa.
Fin Vector—Radiation. Dunham-Bush, Inc., West Hartford, Conn.
Fire Belle—Alarms. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Firecrete—Refractories. Johns-Manville, New York, N. Y.
Firefoil—Insulating panel. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Fire Fybr Felt—Insulation. Baldwin-Hill Co., Trenton, N. J.
Fireite—Furnace cement, refractories. Johns-Manville, New York, N. Y.
Fire Jet—Stokers. Electric Furnace-Man, Inc., Emmaus, Pa.
Firevalve—Ventilators. Swartwout Co., Cleveland, O.
Fireye—Alarms, flame failure controls, recorders, combustion control systems, indicators, recorder-controllers, valves. Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Firite—Stokers. Hoffman Combustion Engineering Co., Lincoln Park, Mich.
Firma—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Firomatic—Filters, cut-offs, links, switches, valves. Morse-Smith-Morse, Inc., Watertown, Mass.
Fitrite—Tools, roof ventilators. Levow, David, Brooklyn, N. Y.
Fixt-Aire—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
Flame-o-trol—Controls. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Flange-Jacks—Separators. Williams & Co., J. H., Buffalo, N. Y.
Flat-Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Flaw-Findr—Dye penetrant. Met-L-Chek Co., Los Angeles, Calif.
Fleet Line—Motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.
Flex—Nipples. Techniflex Corp., Port Jervis, N. Y.
Flexarc—Arc Welders. Westinghouse Electric Corp., Pittsburgh, Pa.
Flexazone—Air conditioning units. National-U.S. Radiator Corp., Johnstown, Pa.
Flexazone—Air conditioning units. Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.
Flexcell—Bases and pads. Celotex Corp., The, Chicago, Ill.
Flexfast—Hose clamps. Flexible Tubing Corp., Guilford, Conn.
Flexfelt—Insulation. National Gypsum Co., Buffalo, N. Y.
Flexflyte—Ducts and duct fittings, hose, tubing. Flexible Tubing Corp., Guilford, Conn.
Flexiblac—Protective coatings. Samuel Cabot, Inc., Boston, Mass.
Flexible Line—Fittings, hose. Dole Refrigerating Co., Chicago, Ill.
Flexibond—Protective coatings. Continental Products Co., Euclid, O.
Flexi-Duct—Connections. Grant Wilson, Inc., Chicago, Ill.
Flexidur—Nozzles. Bahnson Co., Winston-Salem, N. C.
Flexidyne—Couplings, drives. Dodge Mfg. Corp., Mishawaka, Ind.
Flexiflo—Diffusers. Universal Diffuser Corp., Tuckahoe, N. Y.
Flex-I-liner—Rotary pumps. Vanton Pump & Equipment Corp., Hillside, N. J.
Flexitite—Gate valves. Ohio Brass Co., Mansfield, O.
Flexloc—Lock nuts. Standard Pressed Steel Co., Jenkintown, Pa.
FLEXODISC—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
FLEXOLEED—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York.
Flexon—Bellows, pipe joints, ducts and duct fittings. Flexonics Corp., Maywood, Ill.
Flexon Expansion Compensator—Pipe joints. Flexonics Corp., Maywood, Ill.
Flexpansion—Fittings and hose. Techniflex Corp., Port Jervis, N. Y.
Flex Plates—Bases and pads, noise elimination for cooling towers. Vibration Mountings, Inc., Corona, N. Y.
Flex-Seal—Pumps. Bart Mfg. Corp., Belleville, N. J.
Flextan—Packing. Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Flex-Tube—Analyzers, gages, kits, meters, testers, manometers, switches, pitot tubes. Dwyer Mfg. Co., F. W., Michigan City, Ind.
Flex Valve—Valves. Farris Flexible Valve Corp., Palisades Park, N. J.

Flexzorber—Hose. Finn & Company, Inc., T. R., Hawthorne, N. J.

Flex-Zorber—Adsorbers. Saussé & Co., M.W., Los Angeles, Calif.

Flo—Dehydrant and acid neutralizer, for refrigerating systems. Allin Mfg. Co., Chicago, Ill.

Float-O-Matic—Pumps. March Mfg. Co., Inc., Skokie, Ill.

Floatrol—Switches, regulators. Automatic Control Co., St. Paul, Minn.

Flochek—Valves. Taco Heaters, Inc., Cranston, R. I.

Flo-Coater—Booths. Griffin & Co., Louisville, Ky.

Flocold—Unit coolers. Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.

Floguide—Flow meters. Fischer & Porter Co., Hatboro, Pa.

Flo-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.

Flo-Line—Valves. Hanna Engineering Wks., Chicago, Ill.

Flo-Master—Louvers and shutters. Acme Equipment Co., Muskogee, Okla.

Flo-Matic—Conveyors, stokers. American Coal Burner and Wood Stoker Corp., Chicago.

Floor-Level—Radiation. Rempe Co., Chicago.

Florite—Air velocity meters, and anemometers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Florite Desiccant—Dehumidifiers, dehydrators. Floridin Co., Tallahassee, Fla.

Flo-Scope—Meters. Selas Corp. of America, Dresher, Pa.

Flotectic Flux—Welding compounds. Eutectic Welding Alloys Corp., Flushing, N. Y.

Flo-Tee—Fittings. Hi-Flow Products, Inc., Copiague, N.Y.

Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.

Flo-Tube—Conveyors. Canton Stoker Corp., Canton, O.

Flo-watch—Flow meters. Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.

Flow-Cold—Water chillers, compressors, coolers and towers. Acme Industries, Inc., Jackson. Mich.

Flowline—Pipe fittings, flanges. Welding Fittings Corp., New Castle, Pa.

Flowmaster—Pumps. Marco Co., Inc., Saginaw, Mich.

Flow-Mizer—Cooling towers, condensers. Acme Industries, Inc., Jackson, Mich.

Flow-Pac—Chillers, compressors. Acme Industries, Inc., Jackson, Mich.

Flowrator—Meters, systems. Fischer & Porter Co., Hatboro, Pa.

Flowrite—Valves. Powers Regulator Co., Skokie, Ill.

Flow-Temp—Air conditioning Units. Acme Industries, Inc., Jackson, Mich.

Flow-Therm—Chillers, compressors, coolers. Acme Industries, Inc., Jackson, Mich.

Flow Tube—Meters. Foster Engineering Co., Union, N. J.

Fluid Fortress—Fittings. Flodar Corp., Cleveland, O.

Fluid Joists—Coils. Fricke, Fred J., Albuquerque, N. M.

Fluidyne—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.

Fluid-Tite—Pipe, asbestos. Keasbey & Mattison Co., Ambler, Pa.

Fluoroflex—Tubing. Resistoflex Corp., Roseland, N. J.

Fluoroseal—Cement and compounds. Industrial Plastic Fabricators, Norwood, Mass.

Flush-Kleen—Sewage ejectors and pumps. Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.

Flux-'N-Solder—Solder. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Foamglas—Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa.

Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Force-Flo—Circulators, fittings, heaters, regulators, tanks. Kehm Corp., The, Chicago.

Force-Flo—Unit heaters. Trane Co., The, LaCrosse, Wis.

Form-A-Gasket—Cement and compounds. Permatex Co., Inc., Brooklyn, N. Y.

Form-A-Jig—Compounds. Eutectic Welding Alloys Corp., Flushing, N. Y.

Formet—Water treatment. Perolin Co., Inc., New York, N. Y.

Formula 59—Water treatment. Oakite Products, Inc., New York, N.Y.

Fosco—Water heaters. Schoedinger, Inc., F. O., Columbus, O.

4-Star—Adhesive tape. Johns-Manville, New York, N. Y.

Fracto Crete—Refractories. Ramtite Co., The, Chicago Ill.

Francite—Cement, refractories and refractory cement. France Refractories Co., J. H., Snow Shoe, Pa.

Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J.

Franco-Therm—Cement, insulating. France Refractories Co., J. H., Snow Shoe, Pa.

Franset—Cement, refractories and refractory cement. France Refractories Co., J. H., Snow Shoe, Pa.

Franset with Super Bond—Cement, and refractories and refractory cement. France Refractories Co., J.H., Snow Shoe, Pa.

Free-Aire—Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.

Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.

Fre-Flow—Strainers. Fisher Governor, Marshalltown, Ia.

Frigid Arc—Welding electrodes. Eutectic Welding Alloys Corp., Flushing, N.Y.

Frigistat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Frogalloy—Electrodes. McKay Co., Pittsburgh, Pa.

Frost-Tite—Fittings. Remco, Inc., Zelienople, Pa.

Fuelguard—Regulators. Ashcraft Co., J. P., Dallas, Tex.

Fuel Saver—Boilers. International Boiler Works Co., The, East Stroudsburg, Pa.

Fuel Saver—Regulators. Nichols Instruments Co., Baltimore, Md.

Fuelsaver—Controls, regulators. Walker Mfg. & Sales Co., St. Joseph, Mo.

Fueltone X-10—Fuel oil treatment. Ampion Corp., Long Island City, N. Y.

Fuel-tron—Fuel oil treatment. Radiator Specialty Co., Charlotte, N. C.

Fulflo—Filters. Commercial Filters Corp., Melrose, Mass.

Fulgrip—Pulleys and sheaves. Maurey Mfg. Corp., Chicago, Ill.

Fulljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.

Full-view—Meters. Brooks Rotameter Co., Lansdale, Pa.

Fulscope—Recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N Y.

Fusionweld—Tubing. Avon Tube Div., Highbie Mfg. Co., Rochester, Mich.

Fybr-Tech—Gaskets and sheets. Technical Ply-Wood Sales, Chicago, Ill.

Fyr-Feeder—Stokers. American Coal Burner and Wood Stoker Corp., Chicago, Ill.

Fyrite—Analyzers, combustion testing kits. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Fyrite—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.

GA-Gas—Boilers. American Radiator & Standard Sanitary Corp., New York, N. Y.

G. B. C.—Gages, fans. Bate Soot Blower Div., General Blower Co., Inc., Philadelphia, Pa.

G-B Snap-On—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.

G-Fin—Cooling and heating surface, tubing. Griscom-Russell Co., Massillon, O.

GIL—Filters, regulators, valves. Gas & Oil Industry Laboratories, Inc., Irvington, N.J.

GIL Governoret—Valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.

G-K—Cement and compounds. Atlas Mineral Products Co., Mertztown, Pa.

G-R—Aftercoolers, oil coolers, water chillers, exchangers. Griscom-Russell Co., Massillon, O.

GS—Anemometers, hygrometers, indicators, psychrometers, welding and cutting apparatus. General Scientific Equipment Co., Philadelphia, Pa.

GT—Shaft Seals. Greene, Tweed & Co., North Wales, Pa.

Gaco—Pipe fittings, hard rubber pipe. Gates Engineering Co., Wilmington, Del.

Gaco-Neoprene & Rubber—Valves, coatings, fittings, tank linings, pipe. Gates Engineering Co., Wilmington, Del.

Gaco-Neoprene Vinyl—Coatings. Gates Engineering Co. Wilmington, Del.

Gagetron—Regulators. Instruments, Inc., Tulsa, Okla.

Galbestos—Sheet metal. Robertson Co., H. H., Pittsburgh, Pa.

Galongage—Gages. Applied Mechanics Co., Boston, Mass.

Galva-Lux—Enamels and lacquers. Acorn Refining Co., Cleveland, O.

Gascope—Leak detectors. Mine Safety Appliances Co., Pittsburgh, Pa.

Gas-A-Fire—Burners. Automatic Corp., St. Louis, Mo.

Gask-O-Seal—Seals and gaskets. Wolfe Co., Franklin C., Culver City, Calif.

Gas-O-Matic—Gas burners. Williams Div., Eureka Williams Corp., Bloomington, Ill.

Gas Pak—Welding rod. Marquette Mfg. Co., Inc., Minneapolis, Minn.

Gasweld—Torches, meters, valves, regulators, welding and cutting apparatus. Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.

Gear-Draulic—Trenching machines. Auburn Machine Works, Inc., Auburn, Neb.

Gearmotor—Gears. Link-Belt Co., Chicago, Ill.

GearMotoRs—Gears. Philadelphia Gear Works, Inc., Philadelphia, Pa.

Gemco—Bolts, clamps, hangers and supports, nuts and washers, fasteners. Goodloe E. Moore, Inc., Danville, Ill.

Gemware—Hygrometers, psychrometers, thermometers, recorders, switches. G. M. Mfg. Co., New York, N. Y.

Genetron—Refrigerants. General Chemical Div., Allied Chemical & Dye Corp., New York, N. Y.

Gentile—Meters. Foster Engineering Co., Union, N. J.

Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.

Geometric—Chasers. Greenfield Tap & Die Corp., Greenfield, Mass.

Geon—Plastics. Goodrich Chemical Co., B. F., Cleveland, O.

Geophone—Leak detectors. Globe Phone Mfg. Co., Reading, Mass.

Gilbarco—Air conditioning units, cement and compounds, heaters, pumps. Gilbert & Barker Mfg. Co., West Springfield, Mass.

Gilmer—V-belts, v-belt drives. New York Belting & Packing Co., Passaic, N. J.

Gilsonite—Protective coatings. Ohmlac Paint & Refining Co., Inc., Long Island City, N. Y.

Gilt Edge—Belting. Rhoads & Sons, J. E., Wilmington, Del.

Glasfloss—Filters. Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Glassheat—Conductors and panels. Continental Radiant Glass Heating Corp., New York, N. Y.

Glazecoat—Building insulation. Johns-Manville, New York, N. Y.

Glo Tech—Glass pipe. Fischer & Porter Co., Hatboro, Pa.

Glowan—Gas burners. Martin Co., Inc., J. O., San Francisco, Calif.

Glow-Top—Burners. Gordon & Piatt, Inc., Winfield, Kans.

Goetze—Gaskets. Johns-Manville, New York, N. Y.

Gold Bond Therm-Bloc—Insulation. National Gypsum Co., Buffalo, N. Y.

Good—Pumps. Goodfellow Co., Inc., E. D., Memphis, Tenn.

Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.

Grad-U-Motor—Damper operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Gradustat—Regulators, thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Gradutrol—Diaphragm valves, radiator orifices. Minneapolis-Honeywell Regulator Co., Minneapolis. Minn.

Graham—Valves. Texsteam Corp., Houston, Tex.

Granco—Meters, pumps, strainers. Granberg Corp., Oakland, Calif.

Grand Rapids—Boiler vacuum cleaners. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.

Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Granodraw—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Graph-O-Matic—Panel boards. Powers Regulator Co., Skokie, Ill.

Graycote—Cement and compounds. Chicago Gasket Co., Chicago, Ill.

Greastop—Air filters. Air-Maze Corp., Cleveland, O.

Great Seal—Gaskets, packing, tape, valves. New York Belting & Packing Co., Passaic, N. J.

Greenspot—Hose clamps. Scovill Mfg. Co., Waterville Div., Waterville, Conn.

Greyhound—Welders. Duro-Dyne Corp., New Hyde Park, L. I., N. Y.

Grid—Unit coolers, finned surfaces, radiation, unit heaters, humidifiers. Murray Mfg. Co., D. J., Wausau, Wis.

Griptube—Fittings. Flodar Corp., Cleveland.

Gripzins—Expansion bolts. Star Expansion N. Y., Inc., New York, N. Y.

Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.

Gruvagrip—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.

Gruvajoint—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.

Guardian—Oil tank gages. Applied Mechanics Co., Boston, Mass.

Guillotine—Cutters, pipe cutting and threading machines. Wachs Co., E. H., The, Chicago, Ill.

Gunchrome—Refractories and refractory cement. Basic Inc., Cleveland.

Gundol—Refractories and refractory cement. Basic Inc., Cleveland, O.

Gun Mag—Refractories and refractory cement. Basic, Inc., Cleveland, O.

Gun Mix—Refractories and refractory cement. Basic Inc., Cleveland, O.
Gusher—Pumps. Ruthman Machinery Co., Cincinnati, O.
Gyro Mass Meter—Meters. Norwood Controls, A Unit of Detroit Controls, Norwood, Mass.
Gyrol—Drives. American Blower Corp., Detroit, Mich.
Gyrol Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

H & C—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
HH&HHV—Air conditioning units. Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.
HS—Fans. American Blower Corp., Detroit.
HX-Changers—Heat exchangers. Rempe Co., Chicago, Ill.
Hallowell—Bearings. Standard Pressed Steel Co., Jenkintown, Pa.
Hally-Filters. Delavan Mfg. Co., West Des Moines, Ia.
Hammerkraft—Enamels and lacquers. Hilo Varnish Corp., Div. of Carpenter-Morton Co., Everett, Mass.
Hammerlin—Coatings, enamels. Interchemical Corp., Finishes Div., Newark, N. J.
Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.
Hamrflute—Drills. Star Expansion N. Y., Inc., New York, N. Y.
Ham-R-Tool—Tools. Fastway Fasteners, Inc., Lorain, O.
Hamrtwist—Drills. Star Expansion N. Y., Inc., New York, N. Y.
Hancock—Valves. Manning, Maxwell & Moore, Inc., Stratford, Conn.
Handi-Can—Refrigerants. Pennsalt Chemicals Corp., Philadelphia, Pa.
Handi-Heet—Torches. Smith Welding Equipment Corp., Minneapolis, Minn.
Hand O Matic—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.
Handy—Valves. Allin Mfg. Co., Chicago, Ill.
Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.
Handy—Valves. Lunkenheimer Co., Cincinnati, O.
Handy Andy—Vise stands. Western Wire Products Co., St. Louis, Mo.
Handy-Flux—Solder. Handy & Harman, New York, N. Y.
Hardalloy—Electrodes. McKay Co., Pittsburgh, Pa.
Hartmann—Heaters. Montgomery Bros., San Francisco, Calif.
Hazleton—Pumps, strainers, valves. Barrett Haentjens & Co., Hazleton, Pa.
Heath-Crete—Refractories. Quigley Co., Inc., New York, N. Y.
Hearth patch—Refractories and refractory cement Basic Inc., Cleveland, O.
Heart-Oak—Belting. Graton & Knight Co., Inc., Worcester, Mass.
Heat-aid—Refractories. Pyrolite Products Co., Cleveland, O.
Heat-Cel—Hot gas defrosting systems. Dole Refrigerating Co., Chicago, Ill.
Heatcote—High temperature paint. Debevoise Co., The, Brooklyn, N. Y.
Heatflex—Cables, heaters. S&C Mfg. Co., Cincinnati, O.
Heat-Hog—Coolers. Heatron, Inc., York, Pa.
Heatmaster—Heaters. Coleman Co., Inc., The, Wichita, Kans.
Heat-Pak—Boilers, heaters. Aldrich Co., The, Wyoming, Ill.
Heatrim—Radiation. American Radiator & Standard Sanitary Corp., New York, N. Y.
Heat-Rite—Registers. Auer Register Co., Cleveland, O.
Heatsaver—Systems. Advance Pump Co., Berkeley, Calif.
Heatsum—Conductors, cable. Roberson Inc., Seattle, Wash.
Heat-Valve—Ventilators. Swartwout Co., The, Cleveland, O.
Heat Wagon—Heaters. Lennox Industries, Inc., Marshalltown, Ia.
Heavy Duty—Torches, welding and cutting apparatus. Smith Welding Equipment Corp., Minneapolis, Minn.
Heavy Duty—Pipe cutters. Erie Tool Works, Erie, Pa.
Heavy Duty—Pipe wrenches. Ridge Tool Co., Elyria, O.
Heetaires—Conductors and panels, heaters. LaSalle Products, Inc., Buffalo, N. Y.
Heilex—Tanks. Heil Process Equipment Corp., Cleveland, O.
Heliflow—Aftercoolers, chillers, oil coolers, heat exchangers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Hellite—Refractories. Johns-Manville, New York, N. Y.
Hercules—Floats. Henry Owens & Co., Inc., Cranston, R. I.
Herculite—Tanks. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Herculoy—Tubing. Revere Copper and Brass, Inc., New York, N. Y.
Herecrol—Protective Coatings, tank linings, lined pipe. Heresite & Chemical Co., Manitowoc, Wis.
Hev-E-Duty—Burners. Cleaver-Brooks Co., Milwaukee, Wis.
Hev-E-Oil—Burners. Cleaver-Brooks Co., Milwaukee, Wis.
Hex-Changer—Heat Exchangers. Drayer-Hanson, Division of National-U. S. Radiator Corp., Los Angeles, Calif.
Hex-Tex—Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Hi—Bolts, clamps, cleaners, drills, insulation fasteners, pipe hangers and supports, pipe reamers. Holub Industries, Inc., Sycamore, Ill.
Hi-Amp—Tools, pipe clamps. Lenco, Inc., Jackson, Mo.
Hi-Cap—Furnaces. Syncromatic Corp., Watertown, Wis.
Hi-Dri—Refrigerant Dehydrators. Wabash Corp., Chicago, Ill.
Hidden Heat—Coils and panels. Hi-Flow Products, Inc., Copiague, N. Y.
Hideaway—Air conditioning units. Burnham Corp., Irvington, N. Y.
Hideway—Cooling towers. Toungate & Coats, Austin, Tex.
Hi-Duty—Tubing cutters, fittings, shafts, flaring tools. Imperial Brass Mfg. Co., Chicago.
Hi-Duty—Combustion chambers. Monogram Products Co., Inc., Philadelphia, Pa.
Hi-Ef—Filters, heads, separators. Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Hi-Ex—Roof ventilators. Penn Ventilator Co., Philadelphia, Pa.
Highflex—Belting. Goodrich Industrial Products Co., Akron, O.
High Heat Aluminum—Paint. Valdura Div., American-Marietta Co., Chicago, Ill.
High Heat Gray—Paint. Valdura Div., American-Marietta Co., Chicago, Ill.
High - Ten - 500—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Hilco—Filters. Hillard Corp., Elmira, N. Y.
Hilger—Chillers, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Chicago, Ill.
Hi-Lift—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hi-Seal—Cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Hi-Seal—Steel tube fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Hi-Speed—Welding and cutting apparatus, torches. Dockson Corp., Detroit, Mich.
Hitchings—Boilers. Burnham Corp., Irvington, N. Y.
Hi - Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Hi-Temp—Insulation cement, refractories & refractory cement. Zonolite Co., Chicago, Ill.
Hi-Temp—Paint. Illinois Bronze Powder Co., Chicago, Ill.
Hi-Value—Adhesive tape. Johns-Manville, New York, N. Y.
Hoffman—Heaters. Clayton & Lambert Mfg. Co., Louisville, Ky.
Hoffman—Draft controls. Salina Metal Products Co., Salina, Kan.
Hole-Shooter—Drills. Milwaukee Electric Tool Corp., Milwaukee, Wis.
Holgun—Drills. Black & Decker Mfg. Co., Towson, Md.
Hollo-Tech—Doors and panels. Technical Ply-Wood Sales, Chicago, Ill.
Holly—Benders. Griffith Equipment Co., Inc., Los Angeles, Calif.
Holoflite—Dryers. Western Precipitation Corp., Los Angeles, Calif.
Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Holtite—Bolts, screws. Continental Screw Co., New Bedford, Mass.
Honeycomb—Filters. Wilson & Co., Inc., Chicago, Ill.
Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.
Hot Shot—Unit coolers. Drayer-Hanson, Division of National-U. S. Radiator Corp., Los Angeles, Calif.
Hot Spot—Preheaters. Rempe Co., Chicago.
Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.
Houghto-Clean—Boiler cleaning compounds. Houghton & Co., E. F., Philadelphia, Pa.
Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Howlers—Alarms. Benjamin Electric Mfg. Co., Des Plaines, Ill.
Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.
Humidigraph—Humidistats, hygrometers, indicator-controllers. Bristol Co., Waterbury, Conn.
Humidiguide—Hygrometers. Talyor Instrument Companies, Rochester, N. Y.
Humidomist—Nozzles, humidifiers. Supreme Electric Products Corp., Rochester, N. Y.
Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.
Humiduct—Unit air conditioners. Bahnson Co., Winston-Salem, N. C.
Humid - U - Stat—Humidistats. Minneapolis-Honeywell Regulator Co., Minneapolis.
Humistat—Humidistats. American Instrument Co., Inc., Silver Spring, Md.
Humi-Temps—Unit air coolers. Larkin Coils, Inc., Atlanta, Ga.
Hum-O-Zone—Room type humidifiers. HERRmidifier Co., Neffsville, Pa.
Humphrey—Heaters. General Gas Light Co., Kalamazoo, Mich.
Huron—Baseboard radiation. Farrell Associates, Charles, Valencia, Pa.
HusHeater—Heaters. Sims Pump Valve Co., Hoboken, N. J.
Hydralt—Protective coatings. Flintkote Co., The, New York, N. Y.
Hydramotor—Valves. General Controls Co., Glendale, Calif. and Skokie, Ill.
Hydra-Spray—Booths. Griffin & Co., Louisville, Ky.
Hydra-Tube—Dust collectors. Newcomb-Detroit Co., Detroit, Mich.
Hydrecon—Combustion chambers. France Refractories, Co., J. H., Snow Shoe, Pa.
Hydrepair—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hydro-Fin—Radiation. Hydrotherm, Inc., Northvale, N. J.
Hydro-Flo—Heaters, heating systems, circulators, regulators. Bell & Gossett Co., Morton Grove, Ill.
Hydro-Foam—Dust collectors. Mahon Co., R. C., Detroit, Mich.
Hydro-Foil—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hydroguard—Valves. Powers Regulator Co., Skokie, Ill.
Hydroline—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Hydro-Lok—Regulators, valves. American Flow Control Corp., Houston, Tex.
Hydro-Matic—Connectors. Mechanical Products Corp., Chicago, Ill.
Hydromation—Compressors. Admiral Engineering Co., Inc., Chicago, Ill.
Hydron—Bellows. Clifford Mfg. Co., Div. of Standard-Thompson Corp., Waltham, Mass.
Hydro-Precipitator—Washers. Johnson-March Corp., Philadelphia, Pa.
Hydro-Whirl—Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.
Hydrozone—Water treatment. Olin Mathieson Chemical Corp., Industrial Chemical Div., Baltimore, Md.
Hydryer—Dehumidifiers. Pritchard & Co. of California, J. F., Kansas City, Mo.
Hy-Duty—Blades, propeller fans. Schwitzer Corp., Indianapolis, Ind.
Hygrodial—Recorders. Abbeon Supply Co., Jamaica, N. Y.
Hygrodial—Indicators. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hypalon—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Hypalon—Protective coatings. Gates Engineering Co., Wilmington, Del.
Hyrate—Refractories. Plibrico Co., Chicago, Ill.
Hyro—Regulators. Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.
Hytempite—Cement, refractories. Quigley Co., Inc., New York, N. Y.
Hy-Test—Heaters. Burnham Corp., Irvington, N. Y.
Hy-Test—Water heaters. Smith Co., Inc., H. B., The, Westfield, Mass.
Hy-Vent—Eliminators, valves. Taco Heaters, Inc., Cranston, R. I.

IMO—Pumps. De Laval Steam Turbine Co., Trenton, N. J.
INS—Torches. Lincoln Electric Co., The, Cleveland, O.
IRCO—Combustion chambers. Lindy Heaters, Inc., New York, N. Y.
IVCO—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
Ice-Cel—Accumulators, chillers. Dole Refrigeration Co., Chicago, Ill.
Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.
Ideal—Adhesives. Taft Jenkins Co., Inc., Holyoke, Mass.
Ideal—Tools. Boston Machine Works, Co., Lynn, Mass.
Ideal—Traps. Nason Co., Clarkston, Mich.
Idealarc—Welders. The Lincoln Electric Co., Cleveland, O.

IllBronze—Paint. Illinois Bronze Powder Co., Chicago, Ill.
Illco-Way—Water filters, water softeners, water treatment. Illinois Water Treatment Co., Rockford, Ill.
Immersatherm—Thermostats. Mercoid Corp., The, Chicago, Ill
Imperial—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Imperial—Heaters. Payne Company La Puente, Calif.
Impervite—Heads. Falls Industries, Inc., Solon, O.
Impervo—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Inco—Electrodes, flanges, pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Pipe, fittings, flanges, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Tubing. Trent Tube Co., East Troy, Wis.
Indeeco—Heaters, preheaters, pipe heating systems. Industrial Engineering & Equipment Co., St. Louis, Mo.
Indestructible—Gaskets. New York Belting & Packing Co., Passaic, N. J.
Indoor-Outdoor—Thermostats. White-Rodgers Co., St. Louis, Mo.
Industrial Air—Furnaces, heaters. Inland Heater Corp., Minneapolis, Minn.
IngAclad—Clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
In-Line—Reducers and increasers. Link-Belt Co., Chicago, Ill.
Ins-Lite—Insulation. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.
Inspecdor—Doors and panels. Zurn Mfg. Div., A. J. Zurn Industries, Inc., Erie, Pa.
Instant—Heaters, preheaters. Johnson Corp., The, Three Rivers, Mich.
Instant Glo—Combustion chambers. Boston Machine Works Co., Lynn, Mass.
Instant-Hardner—Compounds. Eutectic Welding Alloys Corp., Flushing, N. Y.
Instant-Vane Rail—Vanes. Cain Mfg. Co., Birmingham, Ala.
InstOmatic—Couplings. Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Insulag—Insulation, cement. Quigley Co., Inc., New York, N. Y.
Insulation—Protective coatings. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.
Insulcolor—Vapor barriers. Armstrong Cork Co., Lancaster, Pa.
Insulcrete—Refractories. Quigley Co., Inc., New York, N. Y.
Insul Duct—Duct and duct fittings. Coleman Co., Inc., The, Wichita, Kans.
Insulfil—Insulation. Miracle Adhesives Corp., Bellmore, N. Y.
Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.
Insulkote—Boiler and tank insulation. Johns-Manville, New York, N. Y.
Insul-Pin System—Insulation fasteners and welders. Graham Mfg. Corp., Needham Hts., Mass.
Insul Pipe—Duct and duct fittings. Coleman Co., Inc., The, Wichita, Kans.
Insulseal—Protective coatings. Eagle-Picher Co., Cincinnati, O.
Insulstic—Adhesives. Eagle-Picher Co., Cincinnati, O.
Insultape—Pipe and tubing insulation. Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.
Intensarc—Electrodes. National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
Inter-Matic—Time switches. International Register Co., Chicago, Ill.
Ionaire—Ionization apparatus. Wesix Electric Heater Co., San Francisco, Calif.
Ionizers—Ionization apparatus. Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.
Irenew—Valves. Powell Co., Wm., The, Cincinnati, O.
Irontite—Water treatment. Salsbury Corp., Los Angeles, Calif.
Ironweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Irv-o-lite—Plastic tubing. Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J.
Isomode—Absorbers, bases and pads, vibration isolating. M. B. Mfg. Co., The, New Haven, Conn.
Isotrons—Refrigerants. Pennsalt Chemicals Corp., Philadelphia, Pa.
Ivco—Roof ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.
JC 60—Cement and compounds. Atlas Mineral Products Co., Mertztown, Pa.
J E—Valves. Jackes-Evans Mfg. Co., St. Louis, Mo.
J & H Customized—Motors. Jack & Heintz, Inc., Cleveland, O.
J & L—Tubing. Jones & Laughlin Steel Corp., Pittsburgh, Pa.
J-M—Bases and pads, cement, tape. Johns-Manville, New York, N. Y.
J M Ball—Traps. Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
J-W Gas-Pointer—Leak detectors. Johnson-Williams Inc., Palo Alto, Calif.
J-W Sentinel—Alarms. Johnson-Williams, Inc., Palo Alto, Calif.
J-W Sniffer—Leak testers. Johnson-Williams, Inc., Palo Alto, Calif.
Jal Duct—Pipe. Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Jal Zinc—Sheets. Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Janitrol—Boilers, burners, heaters, furnaces, air conditioning units. Surface Combustion Corp., Toledo, O.
Jarene 8—Tubing. Jarrow Products, Chicago, Ill.
Jeep-A-Trench—Trenching machines. Auburn Machine Works, Inc., Auburn, Neb.
Jennings—Ejectors. Nash Engineering Co., South Norwalk, Conn.
Jet Axial—Ventilators. Detroit Blower Corp., Franklin Park, Ill.
Jetglas—Heaters. Day & Night Mfg. Co., Monrovia, Calif.
Jet-Hard—Electrodes. The Lincoln Electric Co., Cleveland, O.
Jet-Line—Combustion chambers. Grant Wilson, Inc., Chicago, Ill.
Jet Tube—Systems. McQuay, Inc., Minneapolis, Minn.
Jetweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Jiffy—Regulators. Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.
Jiffy Dampers—Dampers. Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
John Crane—Boiler tube expanders, gaskets, seals, packing. Crane Packing Co., Morton Grove, Ill.
Johnson—Boilers. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Join "O" Seal—Joints, pipe. Heating Equipment Co., Detroit, Mich.
Jointite—Cement and compounds. Arco Co., The, Cleveland, O.
Joint Seal—Cement. Armite Laboratories, Los Angeles, Calif.
Jorgensen—Pipe clamps. Adjustable Clamp Co., Chicago, Ill.
Jubilee—Non-metal hose. New York Belting & Packing Co., Passaic, N. J.
Junior—Radiation. Weil-McLain Co., Michigan City, Ind.
Junior—Ventilators. Octagon Ventilator Co., Chicago, Ill.

K—Fittings and flanges. Kuhns Brothers Co., Dayton, O.
KAB Kool—Air conditioning units. Metal Products Engr., Inc., Los Angeles, Calif.
K. A. T.—Compounds and water treatment. American K.A.T. Corp., Garwood, N. J.
K-Fin—Cooling and heating surface, tubing. Griscom-Russell Co., Massillon, O.
K-Louver—Sun reflecting louvers. Kawneer Co., Niles, Mich.
K and M—Controls, floats, governors, indicator-controller, regulators, valve operators, strainers, traps valves. Kieley & Mueller, Inc., Middletown, N. Y.
K-Master—Filters, eleminators, separators, traps. Kaye & MacDonald, Inc., West Orange, N. J.
K-Shield—Boiler and pipe insulation. Robinson Industries, Coleman, Mich.
KX-99—Refractories and refractory cement. Green Fire Brick Co., A.P., Mexico, Mo.
Kab Kooler—Air conditioning units. Onan & Sons Inc., D. W., Minneapolis, Minn.
Kable Kord—Belting. New York Belting & Packing Co., Passaic, N. J.
Kamlok—Couplings, fittings. Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Kantleak—Pipe couplings, pipe fittings, pipe nipples, valves. Anderson Brass Co., Detroit, Mich.
Kane—Boilers. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Kant-twist—Pipe welding clamps. Custanite Corp., Brooklyn, N. Y.
Kaocast—Refractories and refractory cement. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Kaocrete—Refractories and refractory cement. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Kaolight—Refractories and refractory cement. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Kaowool—Refractories and refractory cement. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Karbate—Carbon pipe, heaters, pumps. National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
Karbonite—Destroyers. Anderson Chemical Co., Inc., Macon, Ga.
Kast-O-Lite—Refractories & refractory cement. Green Fire Brick Co., A.P., Mexico, Mo.
Kast-Set—Refractories & refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Kathabar—Dehumidifiers, unit air conditioners, humidifiers, air washers. Surface Combustion Corp., Toledo, O.
Kaylo—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
KaytherM—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Kearsarge—Packing, gaskets. Johns-Manville, New York, N. Y.
Keflex—Absorbers, bellows, ducts and duct fittings, hose, pipe joints, pipe nipples, metal tubing. U. S. Flexible Metallic Tubing Co., Los Angeles, Calif.
Kek—Compounds, steam and water treatments. Kenite Laboratory, Madison, N. J.
Kelbur—Bases and pads. Hobsite Products Co., Harrison, N. J.
Kemaloid—Water treatment compounds, boiler cleaning compounds. McMillan Industrial Supplies, C. C., Portland, Ore.
Kem Cati-Coat—Enamels and lacquers. Sherwin-Williams Co., The, Cleveland, O.
Kem Lustral—Enamels and lacquers. Sherwin-Williams Co., The, Cleveland, O.
Ken—Combustion chambers, fittings & bushings. Barclay, Inc., Robert, Chicago, Ill.
Kenbric—Soot destroyers. Kenite Laboratory, Madison, N. J.
Kennison—Nozzles. Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Keps—Nuts and washers. Shakeproof Div., Illinois Tool Wks., Elgin, Ill.
Keystone—Packaged steam boiler units. Erie City Iron Wks., Erie, Pa.
Keystone—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.
Kindorf—Bolts, hangers and supports, inserts, racks. Steel City Electric Co., Pittsburgh, Pa.
Kinetic—Gas burners. Webster Engineering Co., Tulsa, Okla.
King—Gages. Oil Equipment Mfg. Corp., New Haven, Conn.
King-clip—Valves. Lunkenheimer Co., Cincinnati, O.
King Fill—Alarms. Oil Equipment Mfg. Corp.. New Haven, Conn.
King-Kool—Fans, propeller. Belco Industries, Inc., St. Louis, Mo.
Kleen Air—Filters. Kaye & MacDonald, Inc., West Orange, N. J.
Kleenaire—Ventilators. Hudson Mfg. Co., H.D., Chicago, Ill.
Kleenflo—Unit air filters. Air-Maze Corp., Cleveland. O.
Kleen Koil—Boiler cleaning compounds. Clayton Mfg. Co., El Monte, Calif.
Klero—Packing. Greene, Tweed & Co., North Wales. Pa.
Kling Felt—Gaskets, tape. Products Research Co., Los Angeles, Calif.
Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.
Klip-Kupl—Pipe fittings. American Flow Control Corp., Houston, Tex.
Klixon—Regulators, relays, thermostats. Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Klondike—Arc welders, pipe thawers. Fern, Ralph, Scranton, Pa.
Knock-Out—Arc welders, torches. Lee Co., K. O., Aberdeen, S. D.
Kno-Draft—Air diffusers, sound and volume control units. Conner Engineering Corp., Danbury, Conn.
Kold Board—Insulation. Baldwin-Hill Co., Trenton, N. J.
Kold Wave—Condensers. Heat-Exchangers, Inc., Chicago, Ill.
Koncentrik—Fittings. Special Screw Products, Bedford, O.
Kontrol Motor—Diaphragm valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kooler-Aire—Condensers. United States Air Conditioning Corp., Philadelphia, Pa.
Kool-Shade—Solar heat resisting screens. Reflectal Corp. Subsid., Borg-Warner Corp., Chicago, Ill.
Kool-Temp—Air conditioning units. Midwest Air Conditioning Co., Des Moines, Ia.
Kopr-Kote—Cement and compounds. Jet-Lube, Inc., Burbank, Calif.
Korda—Gaskets. Chicago Gasket Co., Chicago, Ill.
Korduct—Conduit. Johns-Manville, New York.
Kor-It—Drills. Hamlin Co., Inc., J. F., San Francisco, Calif.

Korner-King—Tools. R C S Tool Corp., Bloomington, Ill.
Koroseal—Tank linings; angles, bars, beams, channels and tees; protective coatings; tanks; plastic tubing; plastic sheets; cement and compounds; pipe couplings; ducts and duct fittings; pipe fittings; gaskets; valves. Goodrich Industrial Products Co., B. F., Akron, O.
Koroseal—Conduit, pipe couplings, fittings, plastic pipe, plastic sheets, plastic tubing, plastic valves. Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O.
Krene—Sheets. Bakelite Co., Div. of Union Carbide & Carbon Chemicals Co., New York, N. Y.
Krome Kote—Coatings. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Kromik—Coatings. Sherwin-Williams Co., The, Cleveland, O.
Kromover—Compounds. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Kruzite—Refractories & refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Kuchler-Huhn—Shaft seals. Koppers Co., Inc., Metals Products Div., Baltimore, Md.
Kwick-Kupling—Couplings, joints. American Flow Control Corp., Houston, Tex.
Kwikflux—Solder. Special Chemicals Corp., Ossining, N. Y.
Kwik-Kleen—Compounds, scale removal, treatment. North American Mogul Products Co., The, Cleveland, O.
Kwik-way—Regulators. Hart & Cooley Mfg. Co., Holland, Mich.
Kwik-Steam—Boilers. Littleford Bros., Inc., Cincinnati, O.

L. A. Line—Motors. Louis Allis Co., The, Milwaukee, Wis.
L & H—Heaters. Thermador Electrical Mfg., Los Angeles, Calif.
LJ-1—Torches. Lincoln Electric Co., The, Cleveland, O.
L & N—Indicators. Leeds & Northrup Co., Philadelphia, Pa.
La-Co—Solder and fluxes. Lake Chemical Co., Chicago, Ill.
Lagfas—Adhesives. Foster Co., Benjamin, Philadelphia, Pa.
Lagtone—Adhesives, for pipe covering. Foster Co., Benjamin, Philadelphia, Pa.
Lamneck—Hangers and supports, gas vent and flue. Clayton & Lambert Mfg. Co., Louisville, Ky.
LaMont—High temperature water boilers. International Boiler Works Co., The, East Stroudsburg, Pa.
Landmaco—Pipe cutting machines. Landis Machine Co., Waynesboro, Pa.
Lanhydro—Pipe cutting machines. Landis Machine Co., Waynesboro, Pa.
Lasco—Insulation, plastic pipe. Lynch Asbestos Co., Los Angeles, Calif.
Lattice-Braid—Packing. Garlock Packing Co., The, Palmyra, N. Y.
Lawson—Wrenches. Fairmount Tool & Forging, Inc., Cleveland, O.
L-Blow—Fans, ventilators. Trade-Wind Motor Fans, Inc., Rivera, Calif.
Leader—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Leader—Water heaters. Day & Night Mfg. Co., Monrovia, Calif.
Leadtex—Sheets. Revere Copper & Brass, Inc., New York, N. Y.
Leak Lock—Cement and compounds. Highside Chemicals Inc., Clifton, N. J.
Leak-Tec—Leak testers, and detectors. American Gas & Chemicals, Inc., New York.
Lectro-Clad—Protective coatings, fittings, pipe, sheets. Bart Mfg. Inc., Belleville, N. J.
Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Co., Pittsburgh, Pa.
Led-Plate—Cement and compounds, lubricants. Armite Laboratories, Los Angeles, Calif.
Ledaloyl—Sleeve bearings. Johnson Bronze Co., New Castle, Pa.
Leigh—Roof ventilators. Air Control Products, Inc., Coopersville, Mich.
Leigh Imperial—Metal canopies. Air Control Products, Inc., Coopersville, Mich.
Lekro-Tektor—Electrolytic devices. Marlo Coil Co., St. Louis, Mo.
Lektrik-Air—Ventilators. Hudson Mfg. Co., H.D., Chicago, Ill.
Len-Lox—Ducts and Duct Fittings. Lennox Industries, Inc., Marshalltown, Ia.
Lert-A-Larm—Fire extinguishing systems. Miller-Harris Instrument Co., Milwaukee, Wis.
Letheray—Sterilizing air units. Hanovia Chemical & Mfg. Co., Newark, N. J.
Levalarm—Alarms, cut-offs. Reliance Gauge Column Co., Cleveland, O.
Level Eye—Gages, indicators. Phillips & Co., H. A., Chicago, Ill.
Level-Master—Regulators. Sporlan Valve Co., St. Louis, Mo.
Levelometer—Gages. Liquidometer Corp., Long Island City, N. Y.
Levelrator—Indicators, alarms, recorders, regulators, switches. Fischer & Porter Co., Hatboro, Pa.
Level-Trol—Regulators. Fisher Governor Co., Marshalltown, Ia.
Liberty—Hose. Continental Rubber Wks., Erie, Pa.
Liberty—Packing. Johns-Manville, New York.
Liberty—Ventilators, caps. Penn Ventilator Co., Philadelphia, Pa.
Life Line "A"—Electric motors. Westinghouse Electric Corp., Pittsburgh, Pa.
Lift Gate—Gates, lift, for trucks. Anthony Co., Streator, Ill.
Lightweight Champ—Pipe cutting and threading machines, pipe vise stands. Oster Mfg. Co., Cleveland, O.
Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Lima—Stokers. Carnes, Inc., John R., Lima, O.
Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.
LimiTorque—Valves, valve operators. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Limitrol—Alarms. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Lincwelder—Welders. Lincoln Electric Co., The, Cleveland, O.
Line-Air—Diffusers. Universal Diffuser Corp., Tuckahoe, N. Y.
Lineflow—Fans. American Blower Corp., Detroit, Mich.
Line-o-flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Link-Grip—Pipe wrenches. American Machine Wks., Inc., Racine, Wis.
Lin-Lok—Hose. Mic-Lin Co., Maple Shade, N. J.
Linovector—Heating surface, radiation. Vulcan Radiator Co., Hartford, Conn.
Linoventilator—Unit ventilators. Vulcan Radiator Co., Hartford, Conn.
Lipco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.
Liquid Eye—Sight glasses. Allin Mfg. Co., Chicago, Ill.
Liquid Ice—Water chillers and refrigerating compressors. Cool-Ette, Inc., Detroit, Mich.
Liquid Precipitator—Washers. Johnson-March Corp., Philadelphia, Pa.
Liquid Wrench—Solvent. Radiator Specialty Co., Charlotte, N. C.
Liquiflux—Welding compounds. Sight Feed Generator Co., West Alexandria, O.
Liqui-Jector—Filters. Selas Corp. of America, Dresher, Pa.
Liqui-Med—Oxygen piping and regulating systems. Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Lite Cast—Combustion chambers. Monogram Products Co., Inc., Philadelphia, Pa.
Lite-Mite—Stands, wrenches. International Forge Co., Chicago, Ill.
Lite-O-Matic—Torches, welding and cutting apparatus. Smith Welding Equipment Corp., Minneapolis, Minn.
Lithoform—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Little Beaver—Pumps. Johnston Pump Co., Pasadena, Calif.
Little Blacksmith—Punches, shears. Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Little Giant—Sump pumps. Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Little Giant—Stock and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Little Giant—Unit heaters. John J. Nesbitt, Inc., Philadelphia, Pa.
Little Giant—Pipe crimper tools. Pioneer Tool Company, Racine, Wis.
Livermont—Wrenches, tools. Richmont, Inc., Monrovia, Calif.
Lloyd—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Lo-Blast—Burners. Mid-Continent Metal Products Co., Chicago, Ill.
Loc-A-Leek—Clamps. Burlis Products Co., Brooklyn, N. Y.
Lock-a-bar—Conduits. Stillwater Clay Products Co., The, Cleveland, O.
Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Lock-Joint—Ducts. Inland Steel Products Co., Milwaukee, Wis.
Lock-O-Seal—Seals. Wolfe Co., Franklin C., Culver City, Calif.
Lockseam—Pipe. Naylor Pipe Co., Chicago.
Loctite—Cement and compounds. American Sealants Co., Hartford, Conn.
Lodestar—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Lo-K—Insulation. Lockport Mills, Inc., Lockport, N. Y.
Lolag—Heaters. American Instrument Co., Inc., Silver Spring, Md.
Lo-Line—Cooling towers. Pritchard & Co. of California, J. F., Kansas City, Mo.
Long Life—Hose, packing. Goodall Rubber Co., Trenton, N. J.
Longlife—Coating. Flexrock Co., Philadelphia, Pa.
Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.
Longhorn—Heaters. Hotstream Heater Co., Cleveland, O.
Lo-Set—Stokers. Canton Stoker Corp., Canton, O.
LoStoker—Stokers. Detroit Stoker Co., Monroe, Mich.
Louvent—Ventilators. Octagon Ventilator Co., Chicago, Ill.
Louverail—Louvers and shutters. Cain Mfg. Co., Birmingham, Ala.
Lo-Veyor—Conveyor. Ajax Flexible Coupling Co., Westfield, N. Y.
Lowcost—Boilers. Murray Iron Works Co., Burlington, Ia.
Lown—Machine. San Angelo Foundry & Machine Co., San Angelo, Tex.
Low Pressure Drop—Strainers. Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.
Loxin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Loxit—Fittings. Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Loxite—Pipe covering adhesives, and packing. Xylos Rubber Co., Akron, O.
Lucite—Plastics, powder and resins. duPont de Nemours & Co., E. I., Polychemicals Dept., Wilmington, Del.
Luminite—Boiler cleaning compounds, soot destroyers, steam system treatment. Warren Refining & Chemical Co., The, Cleveland, O.
Luncor—Valves. Lunkenheimer Co., Cincinnati, O.
Lusterlite—Insulation. Insulite Div. Minnesota & Ontario Paper Co., Minneapolis, Minn.
Luxaire—Heaters. Olsen Mfg. Co., C. A., Elyria, O.

M.B.—Heaters. Montgomery Bros., San Francisco, Calif.
M.D.—Boilers. Murray Iron Wks. Co., Burlington, Ia.
M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
M & E—Heaters, tubing. Merchants & Evans Co., Philadelphia, Pa.
M & F—Rubber base enamel. Valdura Div., American-Marietta Co., Chicago, Ill.
M & H—Sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
MIF—Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.
MKO—Pumps, boilers. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
M & M—Alarms, cut-offs, feeders, operators, regulators, switches, valves. McDonnell & Miller, Inc., Chicago.
M-Cal—Nameplates. North Shore Nameplate, Inc., Bayside, N. Y.
M-Pel-Air—Blades, fans, blowers, ventilators. Brookside Corp., McCordsville, Ind.
M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.
M-Scope—Pipe locators, leak detectors. Fisher Research Laboratory, Inc., Palo Alto, Calif.
M & T—Welders. Metal & Thermit Corp., Rahway, N. J.
M-VB—Valves. Scovill Mfg. Co., Waterville Div., Waterville, Conn.
MW-One—Adhesives, cement. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
MW-50—Adhesives, cement. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.
Maco—Treated cloth. Menardi & Co., El Segundo, Calif.
Magic—Cement and compounds. Blue Ridge Talc Co., Inc., Henry, Va.
Magic Carpet—Door controls. Stanley Works, The, New Britain, Conn.
Magic Dial—Pre-assembled control systems. Midwest Automatic Control Co., Des Moines, Ia.
Magic Eye—Sight glasses. Imperial Brass Mfg. Co., Chicago, Ill.
Magic Eye—Door controls. Stanley Works, The, New Britain, Conn.
Magic-Grip—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Magic Pivot—Electric saws. Oster Mfg. Co., John, Milwaukee, Wis.
Magic Wire—Control systems wire. Midwest Automatic Control Co., Des Moines, Ia.
Magnaflow—Pumps. The Corley Co., New York, N. Y.
Magnefer—Refractories and refractory cement. Basic Inc., Cleveland, O.
Magnehelic—Portable analyzers, gages, kits, manometers, meters, switches, testers, tubes. Dwyer Mfg. Co., F. W., Michigan City, Ind.

Magnetrol—Alarms, boiler cut-offs, switches. Schaub Engineering Co., Fred H., Chicago.
Magnex—Scale removal. Magnus Chemical Co., Garwood, N. J.
Magnorite—Cement, refractories and refractory cement. Norton Co., Worcester, Mass.
Mainliner—Fan blades and fans. Burden Co., Alan E., Los Angeles, Calif.
Make & Break—Valves. Dole Refrigerating Co., Chicago, Ill.
Make-Up-Air—Unit heaters. New York Blower Co., Chicago, Ill.
Malgate—Valves. Powell Co., Wm., The Cincinnati, O.
Malrenew—Valves. Powell Co., Wm., The, Cincinnati, O.
Manco—Plastic pipe, absorbers. Manufacturers Corp., Mansfield, O.
Manganend—Electrodes. Arcos Corp., Philadelphia, Pa.
Manganweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Manhattan—Grinders and grinding wheels. Raybestos-Manhattan, Inc., Passaic, N. J.
Manhattan—Packing. Greene, Tweed & Co., North Wales, Pa.
Mar-Flex—Joints. Marquette Coppersmithing Co., Philadelphia, Pa.
Mark Time—Time switches. Rhodes, Inc., M. H., Hartford, Conn.
Mars—Pumps, engines. Solar Aircraft Co., San Diego, Calif.
Marvair—Air conditioning units. Muncie Gear Works, Inc., Muncie, Ind.
Marvel—Heaters. Bastian-Morley Co., Inc., La Porte, Ind.
Marvelwite—Enamels and lacquers. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
Masco—Combustion chambers. Munn & Steele, Inc., South Boston, Mass.
Mascote—Insulation, combustion chambers. Munn & Steele, Inc., South Boston, Mass.
Massachusetts—Fans, unit heaters, blower wheels, air washers, housings, ventilators. Bishop & Babcock Mfg. Co., Cleveland, O.
Master—Fittings. Mel Products Co., The, New Haven, Conn.
Master 150#—Unions. Jefferson Union Co., Inc., Lexington, Mass.
Master—Water heaters. Kehm Corp., The, Chicago, Ill.
Master-Bilt—Pumps. Schaub Engineering Co., Fred H., Chicago, Ill.
Master Pilot—Valves. Powell Co., Wm., The, Cincinnati, O.
Mastic—Concrete insulation. Poe Co., C. W., The, Cleveland, O.
Maxaw—Electric saws. Oster Mfg. Co., John, Milwaukee, Wis.
Maxdril—Drills. Oster Mfg. Co., John, Milwaukee, Wis.
Maximon—Gages. J. E. Longergan Co., Philadelphia, Pa.
Maxsteam—Boilers. Martin Co., Inc., J. O., San Francisco, Calif.
McGregor—Glasses. Chesterton Co., A. W., Everett, Mass.
Measure Marked—Plastic pipe. Plastex Corp., Columbus, O.
Measurrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Mechanipak—Seals. Garlock Packing Co., Palmyra, N. Y.
Meco—Torches, compounds, flame cutters, leak detectors, gages, regulators, valves, welding rod. Modern Engineering Co., St. Louis, Mo.
Medrae—Heaters. Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Melco—Piping oxygen, air conditioning units. Melchior, Armstrong, Dessau Co. of Delaware, Inc., Ridgefield, N. J.
Meletron—Switches. Barksdale Valves, Los Angeles, Calif.
Mercury—Pipe cutting machines, pipe cutters. Obear & Son, W. F., Inglewood, Calif.
Merrill Process—Heating systems. Parks-Cramer Co., Fitchburg, Mass.
Metagraphic—Transmitters. Bristol Co., The, Waterbury, Conn.
Metakote—Enamels and lacquers. Tropical Paint Co., Cleveland, O.
Metalbestos—Caps, pipe and fittings. Wallace Co., William, Metalbestos Div., Belmont, Calif.
Metal-Master—Shears. Wiss & Sons Co., J., Newark, N. J.
Metalflo—Tubes and tubing. H & H Tube & Mfg. Co., Detroit, Mich.
Metameter—Transmitters. Bristol Co., The, Waterbury, Conn.
Metermax—Systems. Leeds & Northrup Co., Philadelphia, Pa.
Meteor—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Met-L-Flex—Bases and pads. Robinson Aviation, Inc. Teterboro, N. J.
Met-L-Tex—Protective coatings. France Refractories Co., J. H., Snow Shoe, Pa.
Metl-Tech—Doors and panels, metal sheets. Technical Ply-Wood Sales, Chicago, Ill.
Mex-Ko—Refractories & refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Miami—Fans. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Micafil—Insulation. Munn and Steele, Inc., South Boston, Mass.
Micrelay—Controllers and starters, relays. Ebert Electronics Corp., Queens Village, N. Y.
Micro—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Micro-Feed—Humidifiers. Cleveland Humidifier Co., Cleveland, O.
Micro-Feeder—Pumps. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Micro-filters—Filters. Selas Corp. of America, Dresher, Pa.
Microflex—Bases and pads. L.O.F. Glass Fibers Co., Toledo, O.
Micro-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Microlite—Insulation, wrap pipe. L.O.F. Glass Fibers Co., Toledo, O.
Micromet—Water treatment. Calgon Co., Pittsburgh, Pa.
Micro Motors—Motors. Redmond Co., Inc., Owosso, Mich.
Micro-Netic—Feeders. Campbell Co., J. A., Long Beach, Calif.
MicroRold—Sheets. Washington Steel Corp., Washington, Pa.
Microtex—Insulation, pipe wrap. L.O.F. Glass Fibers Co., Toledo, O.
Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.
Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.
Midco—Heaters. Mid-Continent Metal Products Co., Chicago, Ill.
Midget—Radiation. Utica Radiator Corp., Utica, N. Y.
Midget—Float valves. Maid-O'-Mist, Inc., Chicago, Ill.
Midget Powerhouse—Unit heaters. Century Engineering Corp., Cedar Rapids, Ia.
Midwest—Pumps. Tech-Tron Corp., Lawrence, Kans.
Mighty Midget—Drills. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Mighty Mite—Thermostats. Mechanical Industries Production Co., Akron, O.
Mikro-Collectro—Dust collectors. Pulverizing Machinery Div., Metals Disintegrating Co., Inc., Summit, N. J.
Mikro-Pulsaire—Dust collectors. Pulverizing Machinery Div., Metals Disintegrating Co., Inc., Summit, N. J.
Mikro Rotary Feeder—Feeders. Pulverizing Machinery Div., Metals Disintegrating Co., Inc., Summit, N. J.
Mil-Ac—Air conditioning units. Ellis & Watts Products, Inc., Cincinnati, O.
Milcor—Angles, ducts, doors and panels, hangers and supports. Inland Steel Products Co., Milwaukee, Wis.
Milford—Tools. Thompson & Son Co., The, Henry G., New Haven, Conn.
Mills—Boilers. Smith Co., Inc., H. B., The Westfield, Mass.
Milvaco—Strainers, valves. Milwaukee Valve Co., Milwaukee, Wis.
Mindicator—Gages. Dickson Co., The, Chicago, Ill.
Mineralead—Cement and compounds. Atlas Mineral Products Co., Mertztown, Pa.
Minicordes—Recorders. Dickson Co., The, Chicago, Ill.
Minirelay—Controllers and starters, relays, switches. Ebert Electronics Corp., Queens Village, N. Y.
Minatan—Machines, tools. Port City Machine & Tool Co., Muskegon, Mich.
Mipco—Valves. Associated Valve & Engineering Co., Chicago, Ill.
Miracle—Adhesives, fasteners. Devices, Inc., A Div. of Miracle Adhesives Corp., Bellmore, N. Y.
Miracle Red—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Mixend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Mizzou—Refractories & refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Mobilbead—Dehumidifiers. Socony-Mobil Oil Co., Inc., New York, N. Y.
Mobilene—Gaskets. Johns-Manville, New York, N. Y.
Model-F—Wrenches. Richmont, Inc., Monrovia, Calif.
Model 199-224—Meters. Barton Instrument Corp., Los Angeles, Calif.
Model Star—Valves. Powell Co., Wm., The, Cincinnati, O.
Moderator—Heating Systems. Webster & Co., Warren, Camden, N. J.
ModernAire—Fans, unit air conditioners. National Gas Equipment Co., Inc., Denison, Tex.
Modu-Aire—Air conditioning units. United States Air Conditioning Corp., Philadelphia, Pa.
Moduflow—Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis.
Modulatic—Boilers. Vapor Heating Corp., Chicago, Ill.
Modutrol—Heating systems, valve and duct operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutron—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modu-Wave—Welders. Sciaky Bros., Inc., Chicago, Ill.
Mogul—Packing. Johns-Manville, New York.
Moisture Magnet—Dehumidifiers. Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Moncrief—Ducts and duct fittings, heaters. Henry Furnace Co., The, Medina, O.
Moncrief—Ducts and duct fittings. Olsen Mfg. Co., C.A., Elyria, O.
Monel—Pipe fittings, flanges, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Monend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Monitor—Boilers. Cleaver-Brooks Co., Milwaukee, Wis.
Monmouth—Humidifiers, Valves. Cleveland Humidifier Co., Cleveland, O.
Monobloc—Pumps. Worthington Corp., East Orange, N. J.
Monobolt—Chillers, heat exchangers, oil coolers, water heaters. Graham Mfg. Co., New York, N. Y.
Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.
Monocast—Refractories and refractory cement. Ramtite Co., The, Chicago, Ill.
Monofin—Radiation. Wesix Electric Heater Co., San Francisco, Calif.
Monoflo—Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.
Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.
Mono Motors—Motors. Redmond Co., Inc., Owosso, Mich.
Mono-Peen—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Monotube—Drives. Link-Belt Co., Chicago, Ill.
Monovent—Ventilators. Burt Mfg. Co., Akron.
Monoweld—Electrodes, arc welding. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Monoxer—Detectors. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Monoxivent—Fittings. Kent-Moore Organization, Inc., Warren, Mich.
Monsoon—Fans. Jamieson Mfg. Co., Dallas, Texas.
Morflex—Flexible couplings. Morse Chain Co., Ithaca, N. Y.
Mor-Grip—Drives, V belts. Maurey Mfg. Corp., Chicago, Ill.
Morlex—Steam system treatment. Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Mortite—Gaskets, tape. Mortell Co., J. W., Kankakee, Ill.
Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Motoreducer—Gear—motors. Falk Corp., Milwaukee, Wis.
Motorgear—Gear—motors. Link-Belt Co., Chicago, Ill.
MotoReducer—Speed reducers. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Motorstoker—Stokers. Hershey Motorstoker, Inc., Manheim, Pa.
Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.
Mototrol—Indicator-controllers. Automatic Control Co., St. Paul, Minn.
Mototurb—Ventilators. Uno Ventilator Co., Malden, Mass.
Mouat—Compounds, eliminators, traps. Squires Co., C. E., The, Cleveland, O.
Mounts—Base and pads. Lord Mfg. Co., Erie, Pa.
Muckle-Vent—Ventilators. Muckle Mfg. Co., Owatonna, Minn.
Multalarm—Alarms. Automatic Control Co., St. Paul, Minn.
Multiblade—Welding fume exhausters. General Blower Co., Morton Grove, Ill.
Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Multi-Cold—Compressors. Multiplex Mfg. Co., Berwick, Pa.
Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multi-Duty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Multi-Flex—Ducts and duct fittings. United States Rubber Co., New York, N. Y.
Multiguard—Electric motors. Lincoln Electric Co., The, Cleveland, O.
Multi-Louver—Drives. Link Belt Co., Chicago, Ill.

Multi Mount—Speed reducers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Multi-Pak—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multiplane—Vibration isolating bases. Lord Mfg. Co., Erie, Pa.
Multi-Pul—Hoists. Multiple Corp., Dayton, O.
Multi-Seal—Repair plugs. Kenney Co., L. C., Chicago, Ill.
Multitherm—Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.
Multi-Tip—Gas burners. Dalzen Mfg. Co., St. Clair, Mich.
Multitube—Tubing. Crescent Insulated Wire & Cable Co., Trenton, N. J.
Multi-V—V-belts. Goodrich Industrial Products Co., Akron, O.
Multivane—Fans, blowers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Multi-V-Drive—Drives. Worthington Corp., East Orange, N. J.
Multi-Wash—Dust collectors, washers. Schneible Co., Claude B., Detroit, Mich.
Multuri—Burners. Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Murex—Welding electrodes. Metal & Thermit Corp., Rahway, N. J.

N-B—Boilers. Nebraska Boiler Co., Inc., Lincoln, Nebr.
NCG—Leak detectors, solder, oxygen systems, welding rod. National Cylinder Gas Co., Chicago, Ill.
N-M-D—Valves. Lunkenheimer Co., Cincinnati, O.
NYB—Heating surface, fans, unit heaters. New York Blower Co., Chicago, Ill.
Nail-A-Matic—Tools. Matrix Engineering Corp., Minneapolis, Minn.
Nalco—Solder. National Lead Co., New York.
Nalco—Water treatment, soot destroyers. National Aluminate Corp., Chicago, Ill.
National Ground Anodes—Devices. National Carbon Co., Div. of Union Carbide Corp., New York, N. Y.
National—Cutters, pipe cutting machines. Wachs Co., E. H., The, Chicago, Ill.
National—Fans, furnaces, heaters. MaGirl Foundry & Furnace Co., Bloomington, Ill.
Natur Temp—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Naturzone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Navalon—Fiber packing. Johns-Manville, New York, N. Y.
N.E. Hite—Units. Barclay, Inc., Robert, Chicago. Ill.
Nelex—Electric heating cable. Nelson Electric Mfg. Co., Tulsa, Okla.
Nelson—Stokers, air diffusers, pumps, air conditioning units, ventilators. Heating Assurance, Inc., Spokane, Wash.
Nelweld—Welders. Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.
Nemo—Insulating cement. Smith & Kanzler Corp., Linden, N. J.
Neobon—Corrosion shields for pipe joints. Atlas Mineral Products Co., Mertztown, Pa.
Neo Coat—Coatings. Pennsalt Chemicals Corp., Philadelphia, Pa.
Neoprene—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Neo-Shear Mounts—Bases and pads. Vibration Mountings, Inc., Corona, N. Y.
Nerva-Kote—Protective coatings. Rubber and Plastics Compound Co., New York, N. Y.
Nerva-Plast—Protective coatings. Rubber and Plastics Compound Co., New York, N. Y.
Nervatape—Industrial tape. Rubber & Plastics Compound Co., New York, N. Y.
Nev-A-Rust—Protective coatings. The Glidden Co., Cleveland, O.
New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
New Multifin—Radiation. American Radiator & Standard Sanitary Corp., New York, N. Y.
New Port—Pumps. Everite Pump & Mfg. Corp., Lancaster, Pa.
Newport—Air conditioning units. Webster & Co., Warren, Camden, N. J.
Niagara—Meters. Buffalo Meter Co., Buffalo.
Nib-Shear—Power shears. H. A. Mfg. Co., York, Pa.
Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nickel-Arc—Electrodes. Alloy Rods Co., York. Pa.
Nickend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nicloy—Pipe, tubes, tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Nicuend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nifer—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
"9000" Arc—Torches. Mid-States Welder Mfg. Co., Chicago, Ill.
No Crush—Hose. Ammerman Co., Inc., Minneapolis, Minn.
No Drip—Insulation, insulating cement, protective coating. J. W. Mortell Co., Kankakee, Ill.
No Drip Tape—Pipe insulation, pipe wrap. Mortell Co., J. W., Kankakee, Ill.
Nocordal—Pipe coils, refrigerating condensers, and heat exchangers. Heil Process Equipment Corp., Cleveland, O.
No-Flex—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
No-Mar—Pipe wrenches. Nielsen, Inc., E. V., Stamford, Conn.
Non-Clog—Sewage ejectors and pumps. Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.
Non-Clogging—Spray nozzles. Link-Belt Co., Chicago, Ill.
Non-Con-Dux—Cement, insulation. Grant Wilson, Inc., Chicago, Ill.
Non-Frost—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Non-Sweat—Insulation. Keasbey & Mattison Co., Ambler, Pa.
No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
No-Ox-Id Warp—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
Norblo—Dust collectors, fans. Northern Blower Co., Cleveland, O.
Norcoat—Tank linings. Norwood Associated Engineers, Inc., Springfield, Mass.
Nordensson—Burners. Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Northco—Ventilators. Wood Mfg. Co., A. R., Luverne, Minn.
No-Spat—Welding compounds. Midland Paint & Varnish Co., Cleveland, O.
No-Thread—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Novelon—Protective coatings, tank linings. Ellicott Fabricators, Inc., Baltimore, Md.
No-Vent—Pumps and systems. Stout & Sons, David, St. Louis, Mo.
Novoid—Insulation, adhesives, vibration isolating bases. National Cork Co., Englewood, N. J.
Nu-Air—Adsorbers. Manning Co., Charles E. Pittsburgh, Pa.
Nu-Air—Fans, window ventilator units, blades, louvers and shutters, radiation. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Nu-Alpina—Ventilators. Inland Steel Products Co.. Milwaukee. Wis.
Nullmatic—Gages, indicators, insulation, recorders. Moore Products Co., The, Philadelphia, Pa.
Nu-Notch—Mushroom ventilators, diffusers. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
NuTwist—Welders. P. R. Mallory & Co., Inc., Indianapolis, Ind.
Nu-Vac—Vacuum cleaners, dust collectors. Empire Chemical Products Co., Newark, N.J.
Nu-Wrap—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Nyavco—Valves, gages. New York Air Valve Corp., Brooklyn, N. Y.
Nylaflow—Non-metal hose and fittings. Polymer Corp., The, Reading, Pa.
Nylasint—Plastics, powder and resins. Polymer Corp. of Pa., Reading, Pa.
Nylatron—Plastics, powder and resins. Polymer Corp. of Pa., Reading, Pa.
Nylo-Seal—Plastic tubing. Imperial Brass Mfg. Co., Chicago, Ill.

OB—Valves. Ohio Brass Co., Mansfield, O.
OCH—Filters. American Air Filter Co., Louisville, Ky.
OPW—Strainers. Jordan Corp., Div. of OPW Corp., Cincinnati, O.
O&S—Burners. Orr & Sembower, Inc., Reading, Pa.
Oakmont-Oil—Boilers. American Radiator & Standard Sanitary Corp., New York, N. Y.
Octopus—Welding fume exhausters. Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Ohioan—Heaters. Hotstream Heater Co., Cleveland, O.
Ohmstone—Panel and control boards. Johns-Manville, New York, N.Y.
Oil-A-Fire—Burners. Automatic Corp., St. Louis, Mo.
Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Oil-O-Matic—Oil burners, heaters. Williams Div., Eureka Williams Corp., Bloomington, Ill.
Oiltex—Gaskets. Chicago Gasket Co., Chicago, Ill.
Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Ol' Faithful—Humidifiers. Maid-O'-Mist, Inc., Chicago, Ill.
Omega—Joints. Marquette Coppersmithing Co., Philadelphia, Pa.
Omniguard—Temperature alarms. Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., West Orange, N. J.
One-Hander—Wrenches. National Pipe Coatings, Inc., Huntington Park, Calif.
Oriflo—Flanges. Builders-Providence, Inc., B-I-F Industries, Inc., Providence, R. I.
Ori-Flowrator—Flow measuring orifices. Fischer & Porter Co., Hatboro, Pa.
"O" Rings—Packing. Linear Inc., Philadelphia, Pa.
Oversize—Refrigerant dehydrators. Wabash Corp., Chicago, Ill.
Oxequip—Oxygen systems, pumps, valves. Oxygen Equipment & Service Co., Chicago.
Ox-Gem—Treatment. Anderson Chemical Co., Inc., Macon, Ga.
Oxweld—Welding rod, oxygen piping & regulating systems, torches, welding and cutting apparatus. Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Oxyarc—Welding and cutting apparatus. Arcos Corp., Philadelphia, Pa.
Oyltite-Stik—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Ozark—Refractories & refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.
Ozonators—Ozone apparatus. Welsbach Corp., The, Kitson Valve Div., Philadelphia, Pa.

PA 400—Dehydrant and acid neutralizer. Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore, Md.
P. B. H.—Cocks, protectors, try cocks. Paul B. Huyette Co., Inc., Philadelphia, Pa.
P-D—Fittings. Sullivan Valve & Engineering Co., Butte, Mont.
P-D—Pumps. Peters-Dalton, Inc., Detroit.
PD—Blowers, dust collectors, stacks and chimneys. Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
PD QC—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
P.E.T.—Drills and motors. Portable Electric Tools, Inc., Chicago, Ill.
P & H—Welding electrodes, engines, hoists, arc welders. Harnischfeger Corp., Milwaukee, Wis.
P.I.V. Variable Speed Drive—Changer. Link-Belt Co., Chicago, Ill.
P-K—Eliminators. Patterson-Kelley Co., Inc., The, E. Stroudsburg, Pa.
PSC—Regulators, dehumidifiers. Perfecting Service Co., Charlotte, N. C.
P-70—Air filters. Air-Maze Corp., Cleveland, O.
Pace-King—Boilers. Burnham Corp., Irvington, N. Y.
Pacemaker—Softeners. Stover Water Softener Co., St. Charles, Ill.
Pacemakers—Coolers. McQuay, Inc., Minneapolis, Minn.
Pacific—Furnaces, heaters. Rosebraugh Co., W. W., Salem, Ore.
Packex—Sewage ejectors. Yeomans Bros. Co., Melrose Park, Ill.
Paco—Turbine pumps. Pacific Pumping Co., Oakland, Calif.
Page Sensor—Alarms. Hogart Engineering Co., Los Angeles, Calif.
Paget—Strainers. Self Cleaning Strainer Co., Oak Lawn, Ill.
PAINTGRIP—Sheets. Armco Steel Corp., Middletown, O.
Paintstiks—Identification markers. Markal Co., Chicago, Ill.
Paladin—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Palco—Packing. Greene, Tweed & Co., North Wales, Pa.
Palcotan—Water treatment. Pacific Lumber Co., The, San Francisco, Calif.
Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.
Palm-Aire—Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz.
Palmetto—Packing, gaskets, shaft seals. Greene, Tweed & Co., North Wales, Pa.
Palmetto SuperSheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Pandux—Thermometer wells. Pacific Transducer Corp., Los Angeles, Calif.
Panelair—Heaters. Payne Company, La Puente, Calif.
Panelbloc—Heaters. Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.
Panel Coil—Coils, dryers, exchangers, heaters. Dean Thermo-Panel Coil Div., Dean Products, Inc., Brooklyn, N.Y.
Panelray—Heaters. Day & Night Mfg. Co., Monrovia, Calif.
Panel-Tex—Panel and control boards. Norristown Asbestos Div., Nicolet Industries, Inc., Norristown, Pa.
Paneltrol—Valves. Taco Heaters, Inc., Cranston, R. I.

Panther—Plastic pipes. Western Plastics Corp., Tacoma, Wash.
Papco—Cutters and tools. Penn Brass & Copper Co., Erie, Pa.
Paracoil—Coils, condensers, heaters, leak detectors, oil coolers, exchangers, preheaters, steam traps, pipe nipples, water chillers, aftercoolers, heating units, valves, vaporizers. Davis Engineering Corp., Elizabeth, N. J.
Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Parallel Shaft—Reducers and increasers. Link-Belt Co., Chicago, Ill.
Paramount Master—Air conditioning units. Essick Mfg. Co., Los Angeles, Calif.
Parasol—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.
Peak-Temp—Preheaters, fuel oil. Cleaver-Brooks Co., Milwaukee, Wis.
Peck Carrier—Conveyors. Link-Belt Co., Chicago, Ill.
Pee Vee Cee—Fittings, hoods, plastic pipe. Atlas Mineral Products Co., Mertztown, Pa.
Pee Vee Seal—Cement and compounds. Atlas Mineral Products Co., Mertztown, Pa.
Peerless—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Peerless—Direct radiation, hangers or brackets. American Radiator & Standard Sanitary Corp., New York, N. Y.
Pelro—Asbestos packing. Greene, Tweed & Co., North Wales, Pa.
Penflex—Hose, flexible, tubing. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Penflex-Weld—Adsorbers. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pennco—Sectional cast iron boilers. Pennsylvania Furnace & Iron Co., Warren, Pa.
Perfectaire—Dehumidifiers, fans, furnaces, heaters, louvers and shutters, air conditioning units. Air Conditioning Engineering Co., Cambridge, Mass.
Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Perfecto—Observation boiler ports, cement. Green Fire Brick Co., A. P., Mexico, Mo.
Perfecto—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Perflex—Hose. Perfecting Service Co., Charlotte, N. C.
Perfusaire—Diffusers, registers. Auer Register Co., Cleveland, O.
Perimaheat—Radiation. Young Radiator Co., Racine, Wis.
Perma-Code—Identification markers, pipe, hole and saddle markers. Brady Co., W. H., Milwaukee, Wis.
Permadine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Perma-Fan—Condensers. Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif.
Permaglas—Stacks & chimneys, heaters. Smith Corp., A. O., Milwaukee, Wis.
Permagum—Adhesives. Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., St. Louis, Mo.
Perm-Align—Drills. Oster Mfg. Co., John, Milwaukee, Wis.
Permaline—Pipe. Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Permanite—Plastic pipe, ducts and duct fittings, and valves. Knight, Maurice A., Akron, O.
Permaseal—Gaskets. Chicago Gasket Co., Chicago, Ill.
PeroKlean—Cleaning compounds, treatment. Peroline Co., Inc., The, New York, N. Y.
Pero-Nite—Soot destroyers. Perolin Co., Inc., New York, N. Y.
Pexto—Brakes, punches, shears, wrenches, machines. Peck, Stow & Wilcox Co., Southington, Conn.
Phenolex Liquid Aluminum—High temperature paint. Claronex Products, Inc., Brooklyn, N. Y.
Philatrol—Changers, feeders. Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Phil-O-Feeder—Feeders. Philadelphia Pump Div., American Meter Co., Philadelphia, Pa.
Phoson—Solder. United Wire & Supply Corp., Cranston, R. I.
Phos-Trode—Electrodes. Ampco Metal, Inc., Milwaukee, Wis.
Phostube—Solder. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Photoswitch—Switches. Combustion Control Div., Electronics Corp. of America, Cambridge, Mass.
Pilostat—Flame failure controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pilot—Valves. Powell Co., Wm., The, Cincinnati, O.
Pilot Generator—Valves. General Controls Co., Glendale, Calif.
Pin-Tite—Fasteners. Taft Jenkins Co., Inc., Holyoke, Mass.
Pioneer—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Pipeasy—Pipe Cement. Flexrock Co., Philadelphia, Pa.
Pipe Line—Strainers. Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.
Pipeliner—Torches, welding and cutting apparatus. Smith Welding Equipment Corp., Minneapolis, Minn.
Pipemaster—Wrenches, pipe vise stands, pipe cutters and vises. Erie Tool Wks., Erie, Pa.
Pipetite-Stik—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Pistonair—Motors. Joy Mfg. Co., Pittsburgh, Pa.
Pitchlign—Roller bearings. Roller Bearing Co. of America, West Trenton, N. J.
Pittsburgh-National—Meters. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Plain—Radiation. Vapor Heating Corp., Chicago, Ill.
Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Plascene—Wire. Chester Cable Corp., Chester, N. Y.
Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.
Plaskon—Plastics, powders and resins. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Plastaloy—Ducts and duct fittings, plastic sheets, tanks. Atlas Mineral Products Co., Mertztown, Pa.
Plastic Gasket—Pipe cement. Flexrock Co., Philadelphia, Pa.
Plasticord—Wiring. Chester Cable Corp., Chester, N. Y.
Plasticore—Wire. Chester Cable Corp., Chester, N. Y.
Plasticote—Electric wire. Chester Cable Corp., Chester, N. Y.
Plastilock—Adhesives. Goodrich Industrial Products Co., B. F., Akron, O.
Plastimode—Sheets. Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, Los Angeles, Calif.
Plastograph—Viscometers. Brabender Corp., Rochelle Park, N. J.
Plastoid—Furnace cement. Plastic Products Co., Detroit, Mich.
Pla-Tank—Ducts and duct fittings, plastic sheets, plastic tubing. Haveg Industries, Inc., Newark, Del.
Platecoils—Coils and radiation, exchangers, heaters, finned surface, superheaters. Tranter Mfg., Inc., Lansing, Mich.
Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Plenum Humidifier—Humidifiers. HERRmidifier Co., Neffsville, Pa.
Plexiform—Fans. Bayley Blower Co., Milwaukee, Wis.
Plica—Hose, tubing. Flexaust Co., New York, N. Y.
Plicast—Refractories. Plibrico Co., Chicago, Ill.
Plidco-Flanges—Fittings, flanges. Pipe Line Development Co., Cleveland, O.
Pliogard—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Pliotron—Filters. Goodyear Tire & Rubber Co., Akron, O.
Plisulate—Insulating cement and insulation. Plibrico Co., Chicago.
Plumber Krak-Stik—Cement and compounds. Lake Chemical Co., Chicago, Ill.
Plumrite—Pipe. Bridgeport Brass Co., Bridgeport, Conn.
Pluralloy—Electrodes. McKay Co., Pittsburgh, Pa.
Pluto-Blue Asbestos—Packing. North American Asbestos Corp., Chicago, Ill.
Ply-Tech—Plywood sheets and board. Technical Ply-Wood Sales, Chicago, Ill.
Pneumastat—Aftercoolers. Schramm, Inc., West Chester, Pa.
Pneumatractor—Aftercoolers. Schramm, Inc., West Chester, Pa.
Pneu-Pump—Pumps. Yeomans Bros. Co., Melrose Park, Ill.
Poeco—Insulation, coatings, concrete insulating. Poe Co., C. W., Cleveland, O.
Polar Pak—Air conditioning units. Coleman Co., Inc., The, Wichita, Kans.
Polartron—Relays, regulators, systems, switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pollux—Meters. Air-Conditioning Equipment Corp., New York, N. Y.
Polyfax—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Poly-Flo—Plastic tubing. Imperial Brass Mfg. Co., Chicago, Ill.
Polymerin—Protective coatings, enamel and lacquers. International Corp., Finishes Div., Newark, N. J.
Polypenco—Plastic pipe, tubing. Polymer Corp., The, Reading, Pa.
Polyprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polytherm—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Pony—Pipe clamps. Adjustable Clamp Co., Chicago, Ill.
Popular—Wrenches. Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.
Poro-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.
Poronze—Filters and porous metals. Wabash Corp., Chicago.
Poro-Stone—Filters, dehumidifiers. Adams Co., Inc., R. P., Buffalo, N. Y.
Porta-Heet—Heaters. Auburn Burner Co., Auburn, Ind.
Port-A-Pony—Pipe cutting machines. Thread-Ezy Mfg. Co., Corunna, Mich.
Porta Drive—Pipe cutting machines. Muncie Gear Wks., Inc., Muncie, Ind.
Porto-Power—Pipe benders and pipe pushers, pumps, punches. Blackhawk Mfg. Co., Milwaukee, Wis.
Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.
Portovent—Hose, duct connections, ducts and duct fittings. Flexaust Co., New York, N. Y.
Posit-Aire—Roof ventilators. Tripar Products, Inc., Royal Oak, Mich.
Positive Arc—Arc welders. Welding Apparatus Co., Chicago, Ill.
Power—Belting. Rhoads & Sons, J. E., Wilmington, Del.
Powairsaver—Propeller fans. Pritchard & Co. of California, J. F., Kansas City, Mo.
Poweraire—Furnaces. Jackson & Church Co., Saginaw, Mich.
Powerated—Furnaces. Jackson & Church Co., Saginaw, Mich.
Power-Flame—Leak detectors. Justrite Mfg. Co., Chicago, Ill.
Power-Flow—Ventilators. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Power Gems—Boilers. Edge Moor Iron Works, Inc., Edge Moor, Del.
Poweroil—Oil burners. Jackson & Church Co., Saginaw, Mich.
Power-Poise Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Power Vane CP—Drills, motors. Chicago Pneumatic Tool Co., New York, N. Y.
Power vent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Prasco & 85% magnesia—Insulation, insulating cement. Fibreboard Paper Products Corp., San Francisco, Calif.
Pratt & Cady—Valves. R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Pre-Bilt—Conveyors. Link-Belt Co., Chicago, Ill.
Precision—Nozzles. Benjamin Air Rifle Co., St. Louis, Mo.
Precisionaire—Diffusers, grilles, registers. Bowman Co., D. F., New Albany, Ind.
Pre-Fab-Ric—Connections. Cain Mfg. Co., Birmingham, Ala.
Pre-Krete—Coatings, tank linings. Patterson-Kelley Co., Inc., The, E. Stroudsburg, Pa.
Premier—Welding rod. American Steel & Wire Div., United States Steel, Cleveland, O.
Pres-stix—Tape. American Tape Co., Detroit, Mich.
Pressure Clix—Switches. Nason Co., Clarkston, Mich.
Pressure-Speed—Parts for heating and air conditioning equipment. Refrigeration Devices Co., Nutley, N. J.
Pressuretrol—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis.
Pressurmite—Switches. Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Prestal—Pipe and tube benders. Tal Bending Equipment, Inc., Milwaukee, Wis.
Prest-O-Lite—Leak detectors, torches. Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Presto-Lock—Couplings. Smith Bros. Co., Oak Park, Ill.
PreSwitch—Switches. Longergan Co., J. E., Philadelphia, Pa.
Princo—Gages, alarms, hygrometers, manometers, psychrometers, regulators, relays, thermometers. Precision Thermometer and Instrument Co., Philadelphia, Pa.
Progress—Boilers. Cleaver-Brooks Co., Milwaukee, Wis.
Propeloflo—Meters. Builders - Providence, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Protecto—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Protectoglo—Controls. Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Protectomotor—Air filter separators. Dollinger Corp., Rochester, N. Y.

Protectorelay—Flame failure controls, relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Protekoflex—Insulation. Miracle Adhesives Corp., Bellmore, N. Y.
Protektinsul—Protective coatings. Miracle Adhesives Corp., Bellmore, N. Y.
Pryzoak—Belting. Graton & Knight Co., Inc., Worcester, Mass.
Psychron—Psychrometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Pul Air—Ventilators. Penn Ventilator Co., Philadelphia, Pa.
Pul-Air Ridge—Ventilators. Penn Ventilator Co., Philadelphia, Pa.
Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.
Pulsatherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pulverzone—Stokers. American Coal Burner and Wood Stoker Corp., Chicago, Ill.
Pump-A-Matic—Pumps. Reif-Rexoil, Inc., Buffalo, N. Y.
PurAir—Adsorbers, air filters, air sterilizing units, ventilators. Barnebey-Cheney Co., Columbus, O.
Purecel—Filters. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.
Purj-All—Compounds. Lindy Heaters, Inc., New York, N. Y.
Purox—Welding and cutting apparatus, torches. Linde Co., Div. of Union Carbide Corp., New York, N. Y.
Pylets—Switches, pilot and signal lights. Pyle-National Co., The, Chicago, Ill.
Pyramid—Packing. Greene, Tweed & Co., North Wales, Pa.
Pyratherm—Controls. Mercoid Corp., The, Chicago. Ill.
Pyrex—Glass pipe, conductors and panels, heaters, thermometer wells, heat exchangers, gage and sight glasses, valves. Corning Glass Wks., Corning, N. Y.
Pyrocouple—Thermometers. Royco Instruments, Albany, Calif.
Pyroflex—Coatings, tank linings, lined pipes, tanks, enamels and lacquers. Knight, Maurice A., Akron.
Pyrotac—Alarms. Illinois Testing Laboratories, Inc., Chicago, Ill.
Pyrotrol—Flame failure controls. Bristol Co., The, Waterbury, Conn.
Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.
Pyrovisor—Controls. Bristol Co., The, Waterbury, Conn.

QD—Pulleys and sheaves. Worthington Corp., East Orange, N. J.
QSU—Couplings. Dahl, G. W., Bristol, R. I.
QS—Circulators, drains, eliminators, regulators, valves. Quality Specialty Co., Inc., Camden, N. J.
Q-T—Sheets and Boards, non-metallic. Celotex Corp., The, Chicago, Ill.
Q-T Ductliner—Insulation. Celotex Corp., The, Chicago, Ill.
Q-Chromastic—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Chrome—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Seal—Cement. Quigley Co., Inc., New York, N. Y.
Q-Seal-Damit—Boiler sealing compounds. Quigley Co., Inc., New York, N. Y.
Quantrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Quick Action—Holders and files. Geneva Mfg. Co., South Elgin, Ill.
Quick-as-Wink—Valves. C. B. Hunt & Son, Inc., Salem, O.
Quick-Coupler—Valves. Dole Refrigerating Co., Chicago, Ill.
Quiet-Flex—Absorbers, hose, joints. Vibration Mountings, Inc., Corona, N. Y.
Quik Heter—Conductors and panels. Adam Electric Co., Frank, St. Louis, Mo.
Quik-Mask—Gaskets. Brady Co., W. H., Milwaukee, Wis.
Quik-Plates—Nameplates. Brady Co., W. H., Milwaukee, Wis.
Quik-Temp—Steam traps. Schaub Engineering Co., Fred H., Chicago, Ill.

RBC—Roller bearings. Roller Bearing Co. of America, West Trenton, N. J.
RB Integral Fan Bases—Bases and pads. Vibration Mountings, Inc., Corona, N. Y.
RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.
RB Vibration Rails—Bases and pads. Vibration Mountings, Inc., Corona, N. Y.
RC Geared—Couplings. Link-Belt Co., Chicago, Ill.
R & G—Grilles, registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
RH—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
RHB Hanger—Absorbers, hangers. Vibration Mountings, Inc., Corona, N. Y.
R. I.—Unions. Rhode Island Fittings Co., Providence, R. I.
R & I—Cement, insulation, refractories and refractory cement. Refractory & Insulation Corp., New York, N. Y.
R & I Super #3000—Refractories and refractory cement. Refractory & Insulation Corp., New York, N. Y.
R-K—Regulators, valves. Ruggles-Klingemann Mfg. Co., Boston, Mass.
R-M—Packing. Raybestos-Manhattan, Inc., Passaic, N. J.
R & M All-Weather—Motors. Robbins & Myers, Inc., Springfield, O.
R & M Moyno—Pumps. Robbins & Meyers, Inc., Springfield, O.
R-Mir-Dek—Protective coatings. Miracle Adhesives Corp., New York, N. Y.
RP—Air filters. Research Products Corp., Madison, Wis.
RP Filter Coat—Oils. Research Products Corp., Madison, Wis.
R/S Controls—Valves. Refrigerating Specialties Co., Chicago, Ill.
RSH Hanger—Absorbers, hangers. Vibration Mountings, Inc., Corona, N. Y.
Ra bloc—Treatment. Turco Products, Inc., Los Angeles, Calif.
Racon Boilers—Heaters. Radiant Heat & Cooling Corp., Santa Clara, Calif.
Racon Kit—Coils and panels. Radiant Heat & Cooling Corp., Santa Clara, Calif.
Radiafin—Finned tubing, finned surface. Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Radial—Unit coolers. McQuay, Inc., Minneapolis, Minn.
Radiant—Direct radiation. Burnham Corp., Irvington, N. Y.
Radiant Baseboard—Radiation. National-U.S. Radiator Corp., Johnstown, Pa.
Radiantrim—Radiation. American Radiator & Standard Sanitary Corp., New York, N. Y.
Radiantrol—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
RadiaVector—Radiation. Dunkirk Radiator Corp., Dunkirk, N. Y.
Radi-Heator—Heaters. Summit Products Co., Uniontown, Pa.
Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.
Radiox—Fan housings. Torrington Mfg. Co., The, Torrington, Conn.
Radi - Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.
Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.
Rador—Thermostats. Vapor Heating Corp., Chicago, Ill.
Rajah—Packing. Johns-Manville, New York, N. Y.
Ramiclase—Refractories and refractory cement. Basic Inc., Cleveland, O.
Ramset—Refractories and refractory cement. Basic Inc., Cleveland, O.
Ramex—Drills, regulators, tools. Nielsen, Inc., E. V., Stamford, Conn.
Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.
Range—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.
Rapiduction—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Rapiduction Jr.—Pipe cutting and threading machines. Oster Mfg. Co., Cleveland, O.
Ratiomotor—Gear—motors. Boston Gear Works, Quincy, Mass.
Ratogate—Valves. Fischer & Porter Co., Hatboro, Pa.
Ratosight—Alarms, flow switches. Fischer & Porter Co., Hatboro, Pa.
Raydiant—Radiation. Weil-McLain Co., Michigan City, Ind.
Rayduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Readi-Fin—Tubing. Reading Tube Corp., New York, N. Y.
Reading—Fittings, valves. R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Ready-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Reco—Steam convertors, heat exchangers, headers, heaters, preheaters, tanks, fuel economizers, separators. Richmond Engineering Co., Richmond, Va.
Reco—Controllers and starters, motors, coils, drains, water filters. Reynolds Electric Co., River Grove, Ill.
Reco-Radi-Aire—Fans. Reynolds Electric Co., River Grove, Ill.
Record-O-Stat—Recorder-controllers. Johnson Service Co., Milwaukee, Wis.
Rectilinear—Burners. Webster Engineering Co., Tulsa, Okla.
Red Cap—Ventilators. Warner Ventilator Co., La Grange, Ind.
Red Devil—Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.
Red Diamond—Refrigerants, welders. Liquid Carbonic Div. of General Dynamics Corp., Chicago, Ill.
Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.
Red Head—Valves. Imperial Brass Mfg. Co., Chicago, Ill.
Redi-Bends—Coils. Capitol Mfg. & Supply Co., Columbus, O.
Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Redi-Vac—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Red-Reading-Mercury—Hygrometers, psychrometers, thermometers. Palmer Thermometers, Inc., Cincinnati, O.
Red Seal—Gaskets. Chicago Gasket Co., Chicago Ill.
Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.
Red Top—Thermostats. H-B Instrument Co., Philadelphia, Pa.
Red Top—Insulation. United States Gypsum Co., Chicago, Ill.
Red Top—Hangers and supports. Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Reductors—Reducers. Boston Gear Works, Quincy, Mass.
Redycote—Coatings. Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Refrigerated Kooler-Aire—Air conditioning units. United States Air Conditioning Corp., Philadelphia, Pa.
Rego—Regulators, torches, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
ReGalv—Coatings. Rotometals, San Francisco, Calif.
Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Reliance—Belting, packing. Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Reliance—Filters and regulators. American Meter Co., Inc., Philadelphia, Pa.
Remotaire—Air conditioning units. American Radiator & Standard Sanitary Corp., New York, N. Y.
Renewo—Valves, boiler gage cocks. Lunkenheimer Co., Cincinnati, O.
Renu-Glas—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Renu-Vent—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Rep—Boiler Compounds. Kenite Laboratory, Madison, N. J.
Reps—Extractors. Walton Co., Hartford, Conn.
Research—Belting. Graton & Knight Co., Inc., Worcester, Mass.
Resiscote—Enamels and lacquers. Reilly Tar & Chemical Corp., Indianapolis, Ind.
Revolving—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Revolving—Ventilators. Burt Mfg. Co., Akron, O.
Rex—Chain drives, coal and ash conveyors, couplings, nozzles, bearings, pumps. Chain Belt Co., Milwaukee, Wis.
Rex—Heaters. Cleveland Heaters Co., Cleveland, O.
Rex—Fans, ventilators, wheels. Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
RexAir—Burners. Reif-Rexoil, Inc., Buffalo, N. Y.
Rexarc—Electrodes, positioners and welders, welding compounds. Sight Feed Generator Co., West Alexandria, O.
Rex-Flex—Hose, and tubing. Flexonics Corp., Maywood, Ill.
Rexglas—Water heaters. The Cleveland Heater Co., Cleveland, O.
RexHeat—Heaters. Reif-Rexoil, Inc., Buffalo, N. Y.
RexPak—Boilers. Reif-Rexoil, Inc., Buffalo, N. Y.
Rexrust—Protective coatings. Continental Products Co., Euclid, O.
Rex-Tube—Duct connections, duct fittings, hose, and tubing. Flexonics Corp., Maywood, Ill.
Rex-Weld—Hose and tubing. Flexonics Corp., Maywood, Ill.
Rexweld—Electrodes. Crucible Steel Co. of America, Pittsburgh, Pa.
Rezistal—Sheets. Crucible Steel Co. of America, Pittsburgh, Pa.
Rhinamel—Enamels and lacquers. Tropical Paint Co., Cleveland, O.
Rid-All—Adsorbers, odor. Abbeon Supply Co., Jamaica, N. Y.
Ridgevent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Ridgid—Pipe cutting machines, drives, extractors, stocks & dies, stands, wrenches, cutters, chasers, reamers, vises. Ridge Tool Co., Elyria, O.
Ridgoil—Oil. Ridge Tool Co., Elyria, O.

Rifco—Unions. Rhode Island Fittings Co., Providence, R. I.
Riflex—Vibration absorbers. United Metal Hose Co., Inc., Long Island City, N. Y.
Rigidon—Pipe, ducts, hoods. Heil Process Equipment Corp., Cleveland, O.
Rigid-Tex-Metals—Sheets. Rigidized Metals Corp., Buffalo, N. Y.
Rigivin—Plastic pipe, hoods. Heil Process Equipment Corp., Cleveland, O.
Rihco—Humidifiers. R. I. Humidifier & Ventilating Co., Inc., Cambridge, Mass.
Rincontrol—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Rimcor—Controls, indicator-controllers, smoke alarms, regulators, systems. Reliance Instrument Mfg. Corp., Glen Cove, Long Island, N. Y.
Ring-Tite—Couplings. Johns-Manville, New York, N. Y.
Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Div. of Carpenter-Morton Co., Everett, Mass.
Ripple-Fin—Cooling and heating surface. McQuay, Inc., Minneapolis, Minn.
Risselt—Air eliminators. Moreheat Distribution, Inc., Cincinnati, O.
Riviera—Air conditioning units. Webster & Co., Warren, Camden, N. J.
Robot—Switches. Miller-Harris Instrument Co., Milwaukee, Wis.
Robot-Eye—Regulators, smoke alarms. Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
Rock cork—Pipe insulation. Johns-Manville, New York, N. Y.
Rocksil—Insulation. North American Asbestos Corp., Chicago, Ill.
Rocop—Heaters. Rome-Turney Radiator Co., Rome, N. Y.
Rod Pak—Electrodes. Marquette Mfg. Co., Inc., Minneapolis, Minn.
Rodpak—Packing. Sims Pump Valve Co., Hoboken, N. J.
Ro-Fin—Tubing. Rome-Turney Radiator Co., Rome, N. Y.
Ro-Flo—Compressors, pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Rolagrip—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Rol-Air—Tools. Imperial Brass Mfg. Co., Chicago, Ill.
Roll-a-Bend—Pipe benders. Radiant Devices, St. Louis, Mo.
Roll-Bond—Heat exchangers. Olin Mathieson Chemical Corp., Metals Div., New York, N. Y.
Roll Matric—Electrodes. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Roll-O-Matic—Filters. American Air Filter Co., Inc., Louisville, Ky.
Rollotron—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Roll-Weld—Pipe, tubing. Aluminum Tubing Co., Jacksonville, Fla.
Roomaire—Air conditioning units. Young Radiator Co., Racine, Wis.
Roomaster—Units. Ajax Corp. of America, Evansville, Ind.
Roommate—Air conditioning units. Nesbitt, Inc., John J., Philadelphia, Pa.
Rotameter—Flow meters. Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Rotary Union—Pipe joints. Perfecting Service Co., Charlotte, N. C.
Rotary Valvent—Ventilators. Swartwout Co., The, Cleveland, O.
Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Roto-Cup—Gas and oil burners. Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Rotocure—Belting. Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.
Rotodip—Chemical feeders. Omega Machine Co., Div. of B-I-F Industries, Inc., Providence, R. I.
Rotograte Stoker—Stokers. Detroit Stoker Co., Monroe, Mich.
Rotojet—Spray nozzles. Binks Mfg. Co., Chicago, Ill.
Roto-louvre—Dryers. Link-Belt Co., Chicago.
Rotomet—Solder and fluxes. Rotometals, San Francisco, Calif.
Rotometric—Solder and fluxes. Rotometals, San Francisco, Calif.
Roto-Mold—Packing. Linear Inc., Philadelphia, Pa.
Rotonetic—Gas burners. Webster Engineering Co., Tulsa, Okla.
RotoStoker—Stokers. Detroit Stoker Co., Monroe, Mich.
RotoStoker—Type C-C—Stokers. Detroit Stoker Co., Monroe, Mich.
Roto-Torq—Tools. Richmont, Inc., Monrovia, Calif.
Roto-trol—Liquid pressure regulators, alarms, indicators, and switches. Healy Ruff Co., St. Paul, Minn.
Roto-Vent—Ventilators. Hudson Mfg. Co., H. D., Chicago, Ill.
Roto-Wash—Booths. Griffin & Co., Louisville, Ky.
Rotrkore—Masonry drills. Star Expansion N. Y., Inc., New York, N. Y.
Rotrtwist—Drills. Star Expansion N. Y., Inc., New York, N. Y.
Round Wound—Transformers. Line Material Industries, McGraw-Edison Co., Milwaukee, Wis.
Roxaprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Royal—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Royal—Packing. United States Rubber Co., New York, N. Y.
Royal-Aire—Air conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
Royal Clipper—Cutters and shears. M-M-A, Inc., Lancaster, Pa.
Royal, The—Ventilators. Penn Ventilator Co., Philadelphia, Pa.
Rubalt—Enamels and lacquers, protective coatings, high temperature paint. Hague & Co., Inc., Alfred, Div. of Lacquer & Chemical Corp., Brooklyn, N. Y.
Rubbon—Solder. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Rub-R-Lon—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.
Rumaco—Pump-motor units. Ruthman Machinery Co., Cincinnati, O.
Rusco—Window panels. Russell Co., F. C., The, Cleveland, O.
Rusco Prime—Windows. Russell Co., F. C., The, Cleveland, O.
Rust Bloc No. 20—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rustbuster—Cleaning compounds, water treatment. Cannon Chemical Co., Inc., Cambridge, Mass.
Rust Eradicator—Water treatment. North American Mogul Products Co., The, Cleveland, O.
Rust Evade—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rust Raider—Compounds. Radiator Specialty Co., Charlotte, N. C.
Rustrem—Protective coatings. Speco, Inc., Cleveland, O.
Rust Remover—Compounds. Turco Products, Inc., Los Angeles, Calif.
Rust Veto—Protective Coatings. E. F. Houghton & Co., Philadelphia, Pa.

S-A—Conveyors, feeders. Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
SA—Valves. Lunkenheimer Co., Cincinnati, O.
SCR—Air conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U. S. Radiator Corp., Johnstown, Pa.
S.F.E.—Insulation. Standard Fuel Engineering Co., Detroit, Mich.
SHB Hanger—Absorbers, hangers. Vibration Mountings, Inc., Corona, N. Y.
S I—Analyzers, indicators, recorders and systems. Standard Instrument Div., Heat-Timer Corp., New York, N. Y.
S & P—Burners, governors, preheaters, strainers, fuel oil units, valves. Staples & Pfeiffer, San Francisco, Calif.
S. R. P. 75—Protective coatings. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
SRP 87—Protective coatings, paint. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
SSS—Belting. Goodall Rubber Co., Trenton, N. J.
Sabanol—Fuel oil treatment. American Sand-Banum Co., Inc., Freeport, N. Y.
Saco—Speed reducers. Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.
Safe-Flo—Heaters. Screw Machine Products Co., Portland, Ore.
Safe Guard—Fuel oil preheaters. Alstrom Corp., New York, N. Y.
Safe-T-Aire—Air sterilizing units, and lamps. Hanovia Chemical & Mfg. Co., Newark, N. J.
Safe-T-Submersion—Boilers, burners, heaters, systems. Stout & Sons, David, St. Louis, Mo.
Safety Pull—Hoists. Coffing Hoist Div., Duff-Norton Co., Danville, Ill.
Safeway Load-Lift—Trucks. American Pulley Co., The, Philadelphia, Pa.
Saint Louis—Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.
Sairset—Cement, refractories and refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Sal Brick—Solder and fluxes. American Solder & Flux Co., Philadelphia, Pa.
Samco—Incinerators. Syrall Mfg. Co., Syracuse, N. Y.
Sanitizer—Treatment. Oakite Products, Inc., New York, N. Y.
Santobrite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.
Santocel—Insulation. Monsanto Chemical Co., St. Louis, Mo.
Santolene—Fuel oil treatment. Monsanto Chemical Co., St. Louis, Mo.
Santosite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.
Saraloy—Gaskets, packing. Saran Lined Pipe Co., Ferndale, Mich.
Sarancote—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Sarine—Treatment. Berna Corp., Garwood, N. J.
Sarine-Amid—Treatment. Berna Corp., Garwood, N. J.
Satanite—Refractories & refractory cement. Green Fire Brick Co., A. P., Mexico, Mo.
Saunders—Cutters. Armstrong Bros. Tool Co., Chicago, Ill.
Saunders—Pipe cutters. Erie Tool Works, Erie, Pa.
Saunders—Diaphragm valves. Grinnell Co., Inc., Providence, R. I.
Saunders Patent—Valves. Hills-McCanna Co., Chicago, Ill.
Sav-A-Tank—Fuel oil treatment. Sudbury Laboratory, Sudbury, Mass.
Scentinel—Compounds. Ampion Corp., Long Island City, N. Y.
Schmidt—Torches. Minn-Kota Foundry & Mfg. Co., Moorhead, Minn.
Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.
Scoop-Rail—Scoops. Cain Mfg. Co., Birmingham, Ala.
Scotch—Adhesive tape. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Scotch-Mund—Boilers. Western Boiler Co., Los Angeles, Calif.
Scotchply—Fittings, plastic pipe. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Scotchrap—Tape, adhesives, pipe wrap. Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich.
Scout—Water heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Screw King—Reducers and increasers. American Pulley Co., The, Philadelphia, Pa.
Screw-Seal—Pipe. Robinson Clay Product Co., Inc., The, Akron, O.
Scroll-Aire—Air heaters. Newcomb-Detroit Co., Detroit, Mich.
Scrugun—Tools. Black & Decker Mfg. Co., The, Towson, Md.
Scruin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Scru-peller—Sewage ejectors and pumps. Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Sea Lion—Leather belting. Chicago Belting Div., Chicago-Allis Mfg. Corp., Chicago, Ill.
Sea Rings—Asbestos packing. Johns-Manville, New York, N. Y.
Sealastic—Fittings, leak detectors. Chicago Forging and Mfg. Co., Chicago, Ill.
Sealdflow—Cooling tower fan drives. Pritchard & Co. of California, J. F., Kansas City, Mo.
Sealeak—Compounds. Ampion Corp., Long Island City, N. Y.
Sealed Life—V-Belts. Dodge Mfg. Corp., Mishawaka, Ind.
Sealfas—Adhesives. Foster Co., Benjamin, Philadelphia, Pa.
Sealmore—Cement and compounds. Armite Laboratories, Los Angeles, Calif.
Sealon—Tank linings. Knight, Maurice A., Akron, O.
Seal-Rite—Cement and compounds. Macksons Co., New York, N. Y.
Seal-Tite—Ducts and duct fittings, pipe and fittings. Williamson Co., The, Cincinnati, O.
Seasonmaker—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
Seasonmaster—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
Seigelite—Gaskets. Johns-Manville, New York.
Seilon—Plastic sheets. Seiberling Rubber Co., Newcomberstown, O.
Selectair—Air conditioning units. Johnson Co., S. T., Oakland, Calif.
Select-A-Spede—Speed changers. Allis Co., Louis, The, Milwaukee, Wis.
Selectric—Heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Selectrol—Regulators. Automatic Control Co., St. Paul, Minn.
Selectron—Plastics, powders and resins. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Selflube—Sleeve bearings. Keystone Carbon Co., Inc., St. Marys, Pa.

Sel-Lok—Parts for heating and air conditioning equipment. Standard Pressed Steel Co., Jenkintown, Pa.

Sells—Bearings. Royersford Foundry & Machine Co., Royersford, Pa.

Sensatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.

Sensitrol—Relays. Weston Electrical Instrument Corp., A Subsidiary of Daystrom, Inc., Newark, N. J.

Sentinel—Valves. McRae Specialty Co., Don, Glendale, Calif.

Sentry—Alarms, smoke indicators, smoke recorders. Edwards, L. V., Rockville Center, N.Y.

Sentry—Draft controls. Krueger Sentry Gauge Co., Green Bay, Wis.

Sentry—Valves. Coppus Engineering Corp., Worcester, Mass.

Sep-return—Separators. Wabash Corp., Chicago, Ill.

Serval—Gaskets. Chicago Gasket Co., Chicago, Ill.

Service—Packing. Johns-Manville, New York.

Servicecoat—Enamels and lacquers. Debevoise Co., The, Brooklyn, N. Y.

Sesure—Gages, Yarnall-Waring Co., Philadelphia, Pa.

Severn—Boilers. American Radiator & Standard Sanitary Corp., New York, N. Y.

Shafconaire—Unit heaters. OverHead Heaters, Inc., Detroit, Mich.

Shafer—Bearings. Chain Belt Co., Milwaukee, Wis.

Shaft King—Reducers, drives. American Pulley Co., The, Philadelphia, Pa.

SHALCO—Aluminum sheets. Mueller Brass Co., Port Huron, Mich.

Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.

Shear-Flex—Bases and pads, noise elimination for cooling towers. Vibration Mountings, Inc., Corona, N. Y.

Shear-Seal—Valves. Barksdale Valves, Los Angeles, Calif.

Shelby—Tubing. National Tube Div., United States Steel Corp., Pittsburgh, Pa.

Shield-Arc—Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.

Ship-Heaters—Boilers. Way-Wolff Associates, Inc., New York, N. Y.

Shockmounts—Bases and pads. Lord Mfg. Co., Erie, Pa.

SHOKSTOP—Absorbers. Wade Mfg. Co., Elgin, Ill.

Shoktrol—Adsorbers. Zurn Mfg. Div., J. A., Zurn Industries, Inc., Erie, Pa.

Shone—Sewage ejectors. Yeomans Bros. Co., Melrose Park, Ill.

Shop King—Welders. Precision Welder Mfg. Co., Chicago, Ill.

Shopmate—Drills. Portable Electric Tools, Inc., Chicago, Ill.

Shuntflo—Meters. Builders-Providence, Inc., Div. of B-I-F Industries Inc., Providence, R. I.

Shure-Set—Tools. Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., Cleveland, O.

Shur-Flo—Switches. Hays Mfg. Co., Erie, Pa.

Shur-Flo—Fans. Walker Mfg. & Sales Co., St. Joseph, Mo.

Shur-Grip—Tools. Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.

Shuttle Break—Switches. Adam Electric Co., Frank, St. Louis, Mo.

Shut-O-Vent—Louvers and shutters. Reed Unit-Fans, Inc., New Orleans, La.

Sigma—Air diffusers, perforated panels. Wakefield Co., The, Vermilion, O.

Signico—Pilot and signal lights. Signal Indicator Corp., Brooklyn, N. Y.

Silastic—Packing. Dow Corning Corp., Midland, Mich.

Sil Bond—Solder. United Wire & Supply Corp., Cranston, R. I.

Silence Service—Noise elimination. Industrial Sound Control Dept. of Koppers Co., Inc., Metal Products Div., Baltimore, Md.

Silent-Aire—Fans, propeller. Swift Mfg. Co. Inc., Royal Oak, Mich.

Silent-Auburn—Burners, heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.

Silent-Breeze—Fans, louvers and shutters, window and ventilator units. Meier Electric & Machine Co., Inc., Indianapolis, Ind.

Silent Chain—Drives. Link-Belt Co., Chicago, Ill.

Silent Duct—Connections. Elgen Mfg. Corp., Long Island City, N. Y.

Silentride—V belts. Zatko Metal Products Co., Euclid, O.

Silentvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Silent Vent—Ventilators. Detroit Blower Corp., Franklin Park, Ill.

Sil Flux—Solder. United Wire & Supply Corp., Cranston, R. I.

Sil-Fos—Solder. Handy & Harman, New York, N. Y.

Silica Gel—Refrigerant dehydrators. Eagle Chemical Co., Inc., Chicago, Ill.

Silicon-Alkyd—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.

Silicone—Protective coatings. Dow Corning Corp., Midland, Mich.

Silimite—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Sillimanite—Refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati.

Sill-Line—Radiation. Nesbitt, Inc., John J., Philadelphia, Pa.

Siloo—Solvents, fuel oil treatment. Petroleum Solvents Corp., New York, N. Y.

Siltube—Solder. All-State Welding Alloys Co., Inc., White Plains, N. Y.

Silver Comet—Coatings. Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.

Silver Star—Torches, welding and cutting apparatus. Smith Welding Equipment Corp., Minneapolis, Minn.

Silver Steel—Tools. Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.

Silverstreak—Drives. Link-Belt Co., Chicago, Ill.

Silver Streak—Blower wheels. Viking Air Products Div., National-U. S. Radiator Corp., Cleveland, O.

Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.

Silvertop—Eliminators, traps. Anderson Co., V. D., The, Div. of International Basic Economy Corp., Cleveland, O.

SilWeld—Solder. Eutectic Welding Alloys Corp., Flushing, N. Y.

Simplex—Gages. Viking Pump Co., Cedar Falls, Ia.

Simplex—Regulators. Bell & Gossett Co., Morton Grove, Ill.

Simplex—Wrenches. Lowell Wrench Co., Worcester, Mass.

Sim-ply-trol—Indicator-controllers, regulators. Assembly Products, Inc., Chesterland, O.

Simsestos—Packing. Sims Pump Valve Co., Hoboken, N. J.

Simsite—Packing. Sims Pump Valve Co., Hoboken, N. J.

Sim-Trol—Controls, combustion regulators. Simplex Mfg. Co., Fond du Lac, Wis.

Sine Switch—Switches. Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.

Single-Flow—Cooling towers. Marley Co., The, Kansas City, Mo.

Sioux—Electric drills, grinders and grinding wheels, saws, shafts. Albertson & Co., Inc., Sioux City, Ia.

Siphon—Ventilators. Octagon Ventilator Co., Chicago, Ill.

Sirocco—Blowers, fans. American Blower Corp., Detroit, Mich.

Skelly—Stokers. Combustion Engineering, Inc., New York, N. Y.

Skimmer—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.

Skip-Tooth—Dies. Nye Tool Co., Chicago, Ill.

Sky-Blast—Roof fan ventilators. Propellair Div., Robbins & Myers Inc., Springfield, O.

Skyline—Ventilators. Arex Co., Chicago, Ill.

Skymaster—Ventilators. Acme Equipment Co., Muskogee, Okla.

Slenderizer—Direct radiation. Burnham Corp., Irvington, N. Y.

Sludge Solvent No. 32—Fuel oil treatment. Montgomery Chemical Co., Jenkintown, Pa.

Sludgit—Fuel oil treatment. Anderson Chemical Co., Inc., Macon, Ga.

Sludgout—Fuel oil treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Slugin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.

Smith-Clamp—Pipe repair clamps. Pipe Line Development Co., Cleveland, O.

Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.

Smog-Free—Odor absorbers. Radex Corp., Chicago, Ill.

Smoke-Trip—Ventilators. Propellair Div., Robbins & Myers, Inc., Springfield, O.

Snapin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.

Sno-Breeze—Air Conditioning units. Palmer Mfg. Corp., Phoenix. Ariz.

Snip-It—Air filters. C.L.B. Co., Houston, Tex.

Snug—Radiation. Weil-McLain Co., Michigan City, Ind.

Sockolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.

Sod-R-Braze—Torches. National Cylinder Gas Co., Chicago, Ill.

Sof Tite—Sheets. Wheeling Corrugating Co., Wheeling, W. Va.

Sof Tite—Sheets. Wheeling Steel Corp., Wheeling, W. Va.

Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Sola-Flex—Pipe joints. Solar Aircraft Co., San Diego, Calif.

Solar Flame—Burners. National-U.S. Radiator Corp., Johnstown, Pa.

Solray—Radiation. Weil-McLain Co., Michigan City, Ind.

Sol-vet—Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.

Solvex—Cleaning compounds. Chemical Solvent Co., Birmingham, Ala.

Solvo-Rust—Solvent. Permatex Co., Inc., Brooklyn, N. Y.

Sonderglass—Glasses. Chesterton Co., A. W., Everett, Mass.

Sonic-Ray—Heaters. Bica Co., Girard, O.

Sonoairduct—Ducts. Sonoco Products Co., Hartsville, S. C.

Sonokleen—Compounds. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.

Son-No-Mar—Enamels and lacquers. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.

Sonotard—Concrete densifiers. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.

So-Soft—Softeners. Stover Water Softener Co., St. Charles, Ill.

Soundliner—Insulation. Baldwin-Hill Co., Trenton, N. J.

Sound Metal—Noise elimination. Industrial Sound Control Dept. of Koppers Co., Inc., Metal Products Div., Baltimore, Md.

Soundscope—Testers. Marsh Instruments Co., Skokie, Ill.

Soundscope—Indicators. Mine Safety Appliances Co., Pittsburgh, Pa.

Sound Stream—Absorbers. Industrial Sound Control Dept. of Koppers Co., Inc., Metal Products Div., Baltimore, Md.

Sound-Zorbers—Vibration absorbers. Finn & Co., Inc., T. R., Hawthorne, N. J.

Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.

Space Saver—Heaters. Payne Company, La Puente, Calif.

Sparktrodes—Electrodes. Dielectric Products Co., Inc., Jersey City, N. J.

Spartan—Packing, belting. Graton & Knight Co., Inc., Worcester, Mass.

Spasaver—Cooler units, Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.

Spearhead—Gasket cutters. Zimmerman Packing Co., Cincinnati, O.

Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.

Spe-D-Flar—Tools. Engesser & Co., William L., El Monte, Calif.

Speedaire—Reducers. Cleveland Worm & Gear Co., Cleveland, O.

Speedaire—Compressors. Dayton Electric Mfg. Co., Chicago, Ill.

Speed Clamps—Hose clamps. Tinnerman Products, Inc., Cleveland, O.

Speed Clips—Insulation fasteners. Tinnerman Products, Inc., Cleveland, O.

Speed Drills—Drills. Speedway Mfg. Co., Div. of Thor Power Tool Co., Chicago, Ill.

Speed Grinders—Grinders. Speedway Mfg. Co., Div. of Thor Power Tool Co., Chicago.

Speed Grips—Nuts. Tinnerman Products, Inc., Cleveland, O.

Speedheater—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Speed Nuts—Locknuts. Tinnerman Products, Inc., Cleveland, O.

Speedomax—Indicator and recorder-controllers, recorders, thermometers. Leeds & Northrup Co., Philadelphia, Pa.

Speed Primer—Pumps. Chain Belt Co., Milwaukee, Wis.

Speed-Rex—Protective coatings. Truscon Laboratories Div., Devoe & Raynolds Co., Inc., Detroit, Mich.

Speed-Thru—Pipe pushers. Mercury Hydraulics, Inc., Denver, Colo.

Speed-Trol—Changers. Sterling Electric Motors, Inc., Los Angeles, Calif.

Speed Variator—Changers. Cleveland Worm and Gear Co., Cleveland, O.

Speedweld—Electrodes. Trindl Products, Ltd., Chicago, Ill.

Speedy—Clamps, cutters, packing, plugs, tools, wrenches. Chicago Specialty Mfg. Co., Chicago, Ill.

Speedy-Cal—Nameplates. North Shore Nameplate Inc., Bayside, N. Y.

Speedy-Marx—Identification markers. North Shore Nameplate Inc., Bayside, N. Y.

Spekaluminite—Coatings. Special Chemicals Corp., Ossining, N. Y.

Spekleen—Compounds. Special Chemicals Corp., Ossining, N. Y.

Sphero—Ball type and Blow-off valves. Fairbanks Co., New York, N. Y.

Spinner—Gravity ventilators. Warner Ventilator Co., LaGrange, Ind.

Spinner—Ventilators. Inland Steel Products Co., Milwaukee, Wis.

Spin-seat—Steam trap floats. Reichert Float & Mfg. Co., Toledo, O.
Spintex—Building and duct insulation. Johns-Manville, New York, N. Y.
Spiralweld—Nickel plated pipe. Taylor Forge & Pipe Wks., Chicago, Ill.
Spiratube—Ducts and duct fittings, hose, tubing. Flexible Tubing Corp., Guilford, Conn.
Spiraweld—Pipes. Naylor Pipe Co., Chicago.
Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.
Spirodome—Spray nozzles. Fluor Products Co., Whittier, Calif.
Spi-Rol-Fin—Radiation. Edwards Engineering Corp., Pompton Plains, N. J.
Spirotallic—Gaskets. Johns-Manville, New York, N. Y.
Spirovane—Fans. Western Blower Co., Seattle, Wash.
Spongex—Bases and pads, gaskets, pipe insulation. Sponge Products Div., B. F. Goodrich Co., Shelton, Conn.
Spotaire—Air conditioning units, heaters. Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.
Spraco—Booths, nozzles aftercoolers, humidifiers, regulators, systems, separators, strainers, washers. Spray Engineering Co., Burlington, Mass.
Spra-Rite—Nozzles. Binks Mfg. Co., Chicago.
Spratower—Cooling Towers. Marley Co., The, Kansas City, Mo.
Spray-Acoustic—Insulation. Sprayo Flake Co., Chicago, Ill.
Spray-It—Air compressors, viscosimeters. Thomas Industries, Inc., Electric Sprayit Div., Sheboygan, Wis.
Spray-Mastic—Protective coatings. Eagle-Picher Co., Cincinnati, O.
Spraywheel—Air washers. Mountain States Equipment Co., Denver, Colo.
Spring-Flex—Absorbers, bases and pads, hangers, noise elimination for cooling tower. Vibration Mountings, Inc., Corona, N. Y.
Springin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Spun steel—Pulleys, sheaves. Mercury Clutch Div., Automatic Steel Products, Inc., Canton, O.
Square-Fin—Radiation. Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Stabilflo—Valves. Foxboro Co., Foxboro, Mass.
Stainlend—Electrodes. Arcos Corp., Philadelphia, Pa.
StainRod—Rods. Eutectic Welding Alloys Corp., Flushing, N. Y.
StainTrode—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.
Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Stalostic—Protective coatings. Eagle-Picher Co., Cincinnati, O.
Standard—Vacuum cleaners, dust collectors. Empire Chemical Products Co., Newark, N. J.
Standard—Ventilators. Burt Mfg. Co., Akron, O.
Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.
Star-O-Zone—Ozone apparatus. Norwood Associated Engineers Inc., Springfield, Mass.
Statick—Ventilators. Hirschman-Pohle Co., Inc., Le Roy, N. Y.
Stat-O-Seal—Seals. Wolfe Co., Franklin C., Culver City, Calif.
Staxauster—Roof ventilators. Allen Cooler & Ventilator, Inc., Rochester, Mich.
Staynew—Filters, silencers. Dollinger Corp., Rochester, N. Y.
Stazin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Steam-Pak—Boilers. York-Shipley, Inc., York, Pa.
Steam-Pakette—Boilers. York-Shipley, Inc., York, Pa.
Steelarc—Electrodes, arc welding. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Steelbestos—Metal sheets. American Steel Band Co., Pittsburgh, Pa.
Steelfin—Surface. New York Blower Co., Chicago, Ill.
Steelflex—Couplings. Falk Corp., Milwaukee.
Steel-Pak—Radiation. Slant-Fin Radiator Corp., Richmond Hill, N. Y.
SteelTectic—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.
Steelweld—Brakes, power shears. Cleveland Crane & Eng. Co., Wickliffe, O.
Stemco—Thermostats. Stevens Mfg. Co., Inc., Mansfield, O.
Sterilamp—Lamps. Westinghouse Electric Corp., Lamp Div., Bloomfield, N. J.
Steritron—Water treatment, water sterilizing units. Hanovia Chemical & Mfg. Co., Newark, N. J.
Sterlco—Pumps, strainers, regulators, traps, valves. Sterling, Inc., Milwaukee.
Sterling-Magic—Non-metal hose. New York Belting & Packing Co., Passaic, N. J.
Stic-Tite—Cement, insulation. Refractory & Insulation Corp., New York, N. Y.
Stillson Heavy Duty Walco—Wrenches. Walworth Co., New York, N. Y.
Stirling—Boilers. Babcock & Wilcox Co., Boiler Div., New York, N. Y.
Stok-A-Fire—Stokers. Automatic Corp., St. Louis, Mo.
Stokerlay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Stonewall—Board and sheets. Ruberoid Co., New York, N. Y.
Storm Shade—Windows. Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Straitflo—Strainers. Hays Mfg. Co., Erie, Pa.
Strand—Grinders and grinding wheels. Franklin Balmar Corp., Baltimore, Md.
Streamjet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Streamline—Couplings, coils, filters, dehydrators, glasses, plugs, purgers, solder, parts for heating and air conditioning equipment, cutters, fittings, hangers, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.
Streamlined—Chambers. Green Fire Brick Co., A. P., Mexico, Mo.
Streamliner—Registers. Auer Register Co., Cleveland, O.
Streamliner—Belting. New York Belting & Packing Co., Passaic, N. J.
Strickler—Pipe cutting and threading machines. Wachs Co., E. H., The, Chicago, Ill.
Strongbarn—Steel sheets. Granite City Steel Co., Granite City, Ill.
Stronghold—Belting. Rhoads & Sons, J. E., Wilmington, Del.
Stubby—Vacuum cleaners, dust collectors. Empire Chemical Products Co., Newark, N. J.
Studin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Stud-Pins—Bolts, toggle and anchor. Fastway Fasteners, Inc., Lorain, O.
Styrene-Copolymer—Plastic pipe. Vanton Pump & Equipment Corp., Hillside, N. J.
Styrofoam—Insulation. Dow Chemical Co., The, Midland, Mich.
Styropol—Adhesives. Adhesive Products Corp., New York, N. Y.
Suburban—Radiation. Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Sudden Depth—Drill. Paine Co., Addison, Ill.
Sullivan—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Summeraire—Heaters. Clayton Mfg. Co., El Monte, Calif.
Sunair—Heaters. Mission Appliance Corp., Hawthorne, Calif.
Sun-Dial—Radiators. Slant-Fin Radiator Corp., Richmond Hill, N. Y.
Sun-Lite-Aire—Sterilizing lamps and units. Sampson Scientific Co., Div. of the Sampson Chemical & Pigment Corp., Chicago, Ill.
Sunnyaire—Heaters. Crane Co., Chicago, Ill.
Sunnybase—Radiation. Crane Co., Chicago Ill.
Sunnyday—Boilers. Crane Co., Chicago, Ill.
Sunnywall—Radiation. Crane Co., Chicago, Ill.
Sunrad—Direct radiation, hangers. American Radiator & Standard Sanitary Corp., New York, N. Y.
Sunray—Radiation. National-U.S. Radiator Corp., Johnstown, Pa.
Super—Transformers. Union Electric & Mfg. Co., Jersey City, N. J.
Super—Vacuum cleaners, dust collectors. Empire Chemical Products Co., Newark, N. J.
Supercutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Super-Diamond—Floor and ceiling plates. Eastern Stainless Steel Corp., Baltimore, Md.
Super Dylan—Plastics, powders and resins. Koppers Co., Inc., Pittsburgh, Pa.
Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superex—Pipe, boiler and tank insulation. Johns-Manville, New York, N. Y.
Super Filter Coat—Adsorbers. Research Products Corp., Madison, Wis.
Superfin—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.
Super-Fine—Insulation and wrap, pipe. L.O.F. Glass Fibers Co., Toledo, O.
Super Finish—Insulation. Refractory & Insulation Corp., New York, N. Y.
Super-Flo—Dehydrators, filters. Remco, Inc., Zelienople, Pa.
Superflo—Heaters. Payne Company, La Puente, Calif.
Superflux—Solder. Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.
Superior—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Superior—Meters. Neptune Meter Co., New York, N. Y.
Super-Jet—Burners. Downing Steel Products, Dayton, O.
Super Light—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.
Super Powerhouse—Insulating cement, insulation. Baldwin-Hill Co., Trenton, N. J.
Superratchet—Ratchet Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Super-Saw—Tools, electric saws. RCS Tool Corp., Bloomington, Ill.
Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Super Silvertop—Traps. The V. D. Anderson Co., Div. of International Basic Economy Corp., Cleveland, O.
Super "60"—Insulation, cement insulating. Eagle-Picher Co., Cincinnati, O.
Super Seal—Valves. Farris Flexible Valve Corp., Palisades Park, N. J.
Supersheat—Gaskets, packing. Greene, Tweed & Co., North Wales, Pa.
Supertemp—Insulation. Eagle-Picher Co., Cincinnati, O.
Supertherm—Heating systems. Midland-Ross Corp., New York, N. Y.
Super Venturi—Fittings. Taco Heaters, Inc., Cranston, R. I.
Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Supplex—Pipe. American Hard Rubber Co., Div. of Amerace Corp., Butler, N. J.
Surefit—Ducts and duct fittings. Henry Furnace Co., Medina, O.
Surefit—Ducts and duct fittings. Olsen Mfg. Co., C. A., Elyria, O.
Sure Return—Condensation return pumps. Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., Chicago, Ill.
Sureweld—Electrodes, welders. National Cylinder Gas Co., Chicago, Ill.
Surfamax—Pipe line filters. Micro Metallic Corp., Glen Cove, N. Y.
Sutco—Electric motors. Sutton Corp., O. A., The, Wichita, Kans.
Sweatflow—Valves. Quality Specialty Co., Inc., Camden, N. J.
Swif—Penetrant solvent. Hercules Chemical Co., Inc., New York, N. Y.
Swish—Cleaning compounds. Montgomery Chemical Co., Jenkintown, Pa.
Sylphon—Steam traps. Webster & Co., Warren, Camden, N. J.
Synchro-Flame—Burners. Synchronous Flame, Inc., Walworth, Wis.
Synchrogear—Changers. American Flexible Coupling Div., Zurn Industries, Inc., Erie, Pa.
Synchro-Lectric—Viscosimeters. Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Synchron—Motors. Hansen Mfg. Co., Inc., Princeton. Ind.
Synchro Valves—Operators, valves. The Bristol Co., Waterbury, Conn.
Syncretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Syncro—Gages, regulators, combustion control systems. Canton Stoker Corp., Canton, O.
Syncrogear—Drives, gear-motors, speed reducers. U. S. Electrical Motors, Inc., Los Angeles. Calif.
Syncro-Spede—Motors. Allis Co., Louis, Milwaukee, Wis.
Syndolag—Refractories and refractory cement. Basic Inc., Cleveland, O.
Synrub—Wire. United States Rubber Co., New York, N. Y.
Syphonaire—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.

TBTO—Water treatment. Metal & Thermit Corp., Rahway, N. J.
TMC—Dehydrators, refrigerant receivers. Tube Manifold Corp., North Tonawanda, N. Y.
T. T.—Smoke guns. Hill & Co., E. Vernon, Lake Geneva, Wis.
"TW"—Unit coolers. McQuay, Inc., Minneapolis, Minn.
TXT—Valves. Texsteam Corp., Houston, Tex.
Tabasco—Water heaters. Kewanee Boiler Div., American-Standard, Kewanee, Ill.
TAC—Wrenches. Proto Tool Co., Div. of Pendleton Tool Industries, Inc., Los Angeles, Calif.
Tall Boy—Heaters. Lennox Industries, Inc., Marshalltown, Ia.
Tamax—Refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati, O.
Tampin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Tamul—Refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati, O.
Tanastic—Belting. Rhoads & Sons, J. E., Wilmington, Del.
Tanco—Insulation, duct, sound deadening. Thompson and Co., Oakmont, Pa.
Tank-O-Meter—Gages, indicators. Uehling Instrument Co., Paterson, N. J.
Tanktrol—Regulators, switches; sprinkler system controls. Automatic Control Co., St. Paul, Minn.
Tannate—Packing. Rhoads & Sons, J. E., Wilmington, Del.
Tannate-Rockwood—Belt drives. Rhoads & Sons, J. E., Wilmington, Del.

Tantalum Fabricated Plate—Capacitors. P. R. Mallory & Co., Inc., Indianapolis, Ind.

Tapebinder—Industrial tape. Gerrard & Co., A. J., Melrose Park, Ill.

Taper-Lock—Couplings, V-belt drives, pulleys and sheaves. Dodge Mfg. Corp., Mishawaka, Ind.

Tasil—Furnace cement, refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati, O.

Tayco-40—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati.

Taycor—Refractories and refractory cement. Taylor Sons Co., The Charles, Cincinnati, O.

Teel—Pumps, circulators. Dayton Electric Mfg. Co., Chicago, Ill.

Teflon—Gaskets, plastic tubing. Chicago Gasket Co., Chicago, Ill.

Teflon—Pipe joints, packing. United States Gasket Co., Camden, N. J.

Teflon—Plastics, powder and resins. duPont deNemours & Co., E. I., Polychemicals Dept., Wilmington, Del.

Teflon-ize—Protective coatings. Chicago Gasket Co., Chicago, Ill.

Teksag—Boiler cleaning compounds. Agnew & Tomlinson, Long Island City, N. Y.

Tektolog—Recorders. Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.

Tektor—Switches, alarms. Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.

Tel-A-Pipe—Identification markers for piping. Westline Products Div. of Western Lithograph Co., Los Angeles, Calif.

Telecator—Gages, recorders and recorder-controllers. Automatic Control Co., St. Paul.

Telecode—Relays. Benjamin Electric Mfg. Co., Des Plaines, Ill.

Telescon—Recorders, recorder-controllers. Automatic Control Co., St. Paul, Minn.

Teletrol—Controllers and starters. Airgard Mfg. Co., Chicago, Ill.

Tellevel—Switches. Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., Aurora, Ill.

Telstor—Gages, alarms. Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.

Teltru—Anemometers, gages, indicators. Hill & Co., E. Vernon, Lake Geneva, Wis.

Temflex—Plastic tubing. Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J.

Tempchek—Insulation. Philip Carey Mfg. Co., Lockland, Cincinnati, O.

Temp-lo—Insulation. Lockport Mills, Inc., Lockport, N. Y.

Tempmaster—Thermostats. Crown Controls Co., Inc., New Bremen, O.

Tempoint—Thermometers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Tempotherm—Thermostats. General Controls Co., Glendale, Calif.

Temp-R-izer—Burners. **Laharco Industries, Minneapolis, Minn.**

Temproof—Bases and pads. Lord Mfg. Co., Erie, Pa.

Tempscribe—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Temtrim—Radiation. American Radiator & Standard Sanitary Corp., New York, N. Y.

Tenite—Plastics. Plastics Div., Eastman Chemical Products, Inc., Kingsport, Tenn.

Tenite Acetate—Plastics, powders and resins. Eastman Chemical Products, Inc., Subsidiary, Eastman Kodak Co., New York, N. Y.

Tenite Butyrate—Plastics, powders and resins. Eastman Chemical Products, Inc., Subsidiary, Eastman Kodak Co., New York, N. Y.

Tenite-Kralastic—Plastic pipe. **Texas Vitrified Pipe Co., Mineral Wells, Tex.**

Tenite Polyethylene—Plastics, powders and resins. Eastman Chemical Products, Inc. Subsidiary, Eastman Kodak Co., New York, N. Y.

Tensilend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.

Tensulate—Insulation. Tennessee Products and Chemical Corp., Nashville, Tenn.

Tergitol—Water treatment. Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.

Termin-o-Seal—Seals. Wolfe Co., Franklin C., Culver City, Calif.

Testite—Fittings. General Fittings Co., East Greenwich, R. I.

Texan—Heaters. Hotstream Heater Co., Cleveland, O.

Texdrive—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texiron—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texrope—V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texolite—Tubing. General Electric Co., Laminated Products Dept., Coshocton, O.

Texway—Bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

T-Flo—Dehydrators. Ansul Chemical Co., Refrigeration Div., Marinette, Wis.

Tharco—Cement. Dicks-Armstrong-Pontius, Inc., Detroit.

Thawzone—Dehydrant and acid neutralizer. Highside Chemicals, Inc., Clifton, N. J.

Therma-Cal—Nameplates. North Shore Nameplate Inc., Bayside, N. Y.

Thermaflex—Connectors, tubing, ducts, and duct fittings, hose. Flexible Tubing Corp., Guilford, Conn.

Therma-Koil—Tubing. Radiant Heat and Cooling Co., Santa Clara, Calif.

Thermalbridge—Thermometers. Thompson Research & Mfg. Co., Davenport, Fla.

Thermalink—Heaters, preheaters. Electro-Therm, Inc., Silver Spring, Md.

Thermal Electric—Systems. Fluid Systems, Inc., New Haven, Conn.

Thermalite—High temperature paint. Tropical Paint Co., Cleveland, O.

Thermasil—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Thermatrol—Valves. Schnacke, Inc., Evansville, Ind.

Thermatube—Pre-insulated pipe. Flexible Tubing Corp., Guilford, Conn.

Thermek—Tubing, aftercoolers, chillers, coils, condensers, coolers, exchangers, preheaters, surface cooling. Heatron, Inc., York, Pa.

Thermidaire—Furnaces, heaters, heating and ventilating units, air conditioning units. Campbell Co., E. K., Kansas City, Mo.

Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.

Thermobank—Systems. Kramer Trenton Co., Trenton, N. J.

Thermobestos—Pipe, boiler and tank insulation. Johns-Manville, New York, N. Y.

Thermobloc—Heaters. Prat-Daniel Corp., Thermobloc Div., South Norwalk, Conn.

Thermo Clix—Switches. Nason Co., Clarkston, Mich.

Thermodulor—Control systems. Carvell Heat Equipment Co., Los Angeles, Calif.

Thermoflex—Strainers, heating systems, radiator orifices, traps, valves. Cashin Co., W. D., Boston, Mass.

Thermo Grip—Torches. Ideal Industries, Inc., Sycamore, Ill.

Thermoguide—Thermometers. Taylor Instrument Companies, Rochester, N. Y.

Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.

Thermoil-Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Thermojet—Systems. International Boiler Works Co., The, East Stroudsburg, Pa.

Thermolite—Plastics, powders and resins. Metal & Thermit Corp., Rahway, N. J.

Thermolier—Unit heaters. Grinnell Co., Inc., Providence, R. I.

Thermopane—Windows. Libbey-Owens-Ford Glass Co., Toledo, O.

Thermoseal—Windows. Russell Co., F. C., The, Cleveland, O.

Thermoswitch—Thermostats, regulators. Fenwal, Inc., Ashland, Mass.

Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.

ThermoTrode—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.

Thermotrol—Valves. Sterling, Inc., Milwaukee, Wis.

Therm-otrols—Thermometers. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.

Thermwire—Cables. Wiegand Co., Edwin L., Pittsburgh, Pa.

Thermxchanger—Condensers, converters, coolers, exchangers. Cooley Co., E. C., San Francisco, Calif.

Thick Coat—Protective coatings. Pennsalt Chemicals Corp., Philadelphia, Pa.

Thick or thin—Cement and compounds. Jet-Lube, Inc., Burbank, Calif.

Thinline—Air conditioning units. General Electric Co., Appliance & Television Receiver Div., Louisville, Ky.

Thin Man—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Thin Tube—Radiation. National-U.S. Radiator Corp., Johnstown, Pa.

Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.

Thorobred cog-belt—V belts and v-belt drives. Dayton Rubber Co., Dayton, O.

Thoro-Mix—Burners. Power-Flame Div., Inc., Grandview, Mo.

Thread-Tite—Cement and compounds. Armite Laboratories, Los Angeles, Calif.

Thred-O-Matic "22" & "44"—Machines, Pipe Cutting. Collins Machinery Corp., Los Angeles, Calif.

Thredolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.

3C—Motor controls. Clark Controller Co., Cleveland, O.

3M—Cements and compounds, adhesives, insulation, pipe fittings, plastic pipe. Minnesota Mining & Mfg. Co., St. Paul, Minn.

3 Way Weather-Flo—Thermostats. Automatic Devices Co., Inc., Western Springs, Ill.

Thriftmaster—Convection radiation. General Heating Products Co., Philadelphia, Pa.

Thriftmaster—Water softeners. Modern Div., George Getz Corp., Rockford, Ill.

Throway—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Thunder-Core—Drills. New England Carbide Tool Co., Inc., Medford, Mass.

Thunder-Twist—Drills. New England Carbide Tool Co., Inc., Medford, Mass.

Thur-Ma-Lox—Coatings. Dampney Co. of America, Boston, Mass.

TI-CO—Galvanized sheet steel. Inland Steel Co., Chicago, Ill.

TI-CO—Galvanized sheet steel. Inland Steel Products Co., Milwaukee, Wis.

Ticotherm—Boilers. Titusville Iron Works Co., The, Titusville, Pa.

Tiger—Packing. Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., Cambridge, Mass.

Tillotson—Steam traps. **Henry Owens & Co., Inc., Cranston, R. I.**

Tilt Trap—Steam traps. Nason Co., Clarkston, Mich.

Timercoid—Time switches. **Mercoid Corp., Chicago, Ill.**

Time-O-Stat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Tin-Ezy—Coatings, solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Tinol—Solder and fluxes. American Solder & Flux Co., Philadelphia, Pa.

Tiny—Traps. Nason Co., Clarkston, Mich.

Titan—Traps. Nason Co., Clarkston, Mich.

Tite Kote—Sheets. Reeves Steel & Mfg. Co., Dover, O.

Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.

Toastmaster—Heaters. McGraw-Edison Co., Clark Div., Chicago, Ill.

Tom Thumb Pipe Master—Pipe machines. Oster Mfg. Co., Cleveland, O.

Tonrac—Compressors. American Blower Corp., Detroit, Mich.

Tool-Arc—Electrodes. Alloys Rods Co., York, Pa.

Toolweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Torchweld—Regulators, torches, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.

Tork Master—Switches. Tork Time Controls, Inc., Mt. Vernon, N. Y.

Torkotherm—Switches. Tork Time Controls, Inc., Mt. Vernon, N. Y.

Tork Weather Control—Switches. Tork Time Controls, Inc., Mt. Vernon, N. Y.

Torpedo—Dehydrators, filters, strainers. Imperial Brass Mfg. Co., Chicago, Ill.

Torq-Stop—Wrenches. Richmont, Inc., Monrovia, Calif.

Torque-Arm—Reducers. Dodge Mfg. Corp., Mishawaka, Ind.

Totalume—Paint. Wilbur & Williams Co., Brighton, Mass.

Totrust—Protective coatings, enamels and lacquers. Wilbur & Williams Co., Brighton, Mass.

Trace—Refrigerant leak detectors. Highside Chemicals, Inc., Clifton, N. J.

Tramrail—Conveyors. Cleveland Crane & Eng. Co., Wickliffe, O.

Transaire—Transmitters. Taylor Instrument Companies, Rochester, N. Y.

Transflex—Plastic tubing. Irvington Div., Minnesota Mining and Mfg. Co., Irvington, N. J.

Transhield—Pipe wrap. Johns-Manville, New York, N. Y.

Transite—Conduit, duct connections, pipes, ducts and duct fittings, sheets and board. Johns-Manville, New York, N. Y.

Transparent—Analyzers, gages, kits, meters, switches, testers, tubes, manometers. Dwyer Mfg. Co., F. W., Michigan City, Ind.

Trantex—Adhesives. Johns-Manville, New York, N. Y.

Trap-Dri—Dehydrators. A-P Controls Div., Controls Co. of America, Milwaukee, Wis.

Treet-O-Control—Steam system and water treatment, pumps. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.

Treet-O-Unit—Feeders, pumps, water treatment. Proportioneers, Inc., Div. of B-I-F Industries, Inc., Providence, R. I.

Trenchliners—Trenching machines. Parsons Co., Div. of Koehring Co., Newton, Ia.

Trentweld—Tubing, pipe. Crucible Steel Co. of America, Pittsburgh, Pa.

Triad—Stocks and dies. Nye Tool Co., Chicago, Ill.

Triangle—Water heater. Day & Night Mfg. Co., Monrovia, Calif.
Tribune—Hose. Continental Rubber Wks., Erie, Pa.
Tri-Clad—Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.
Trident—Meters. Neptune Meter Co., New York, N. Y.
Tri-Flex—Registers, grilles. Tuttle & Bailey, Div. of Allied Thermal Corp., New Britain, Conn.
Tri-Flux—Motors. Redmond Co., Inc., Owosso, Mich.
Tri-Flux—Solder. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Tri-Guard—Protective coatings. Foster Co., Benjamin, Philadelphia, Pa.
Trimline—Radiation. Vulcan Radiator Co., Hartford, Conn.
Trimo—Cutters. Armstrong Bros. Tool Co., Chicago, Ill.
Trimo—Pipe wrenches. Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.
Trimo Alloy—Pipe wrenches. Trimont Mfg. Co., Div of St. Pierre Chain Corp., Worcester, Mass.
Trimo Spiral Grip—Pipe wrenches. Trimont Mfg. Co., Div. of St. Pierre Chain Corp., Worcester, Mass.
Trio-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Triple-A—Enamels and lacquers, paint, protective coatings. Quigley Co., Inc., New York.
Triple-Seal—Fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Triple Trap—Steam traps. Acker Corp., Meridian, Miss.
Triplex—Stocks and dies. Nye Tool Co., Chicago, Ill.
Tripl-Aire—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
Tri-Rotor—Pumps. Yale & Towne Mfg. Co., White Plains, N. Y.
Tri-snap—Thermostats. Westinghouse Electric Corp., Pittsburgh, Pa.
Tri-Sul-Ite—Pipe and tubing insulation. Ziegler & Co., G. S., Great Neck, N. Y.
Trojan—Boilers. Burnham Corp., Irvington, N. Y.
Trojan—Stokers. Auburn Burner Co., Auburn, Ind.
Tropelite—Coatings. Tropical Paint Co., Cleveland, O.
Tropic-Aire—Air conditioning units. McGraw-Edison Co., Clark Div., Chicago.
Tropic-Breeze—Air conditioning units, burners. Dalzen Mfg. Co., St. Clair, Mich.
Tropilux—Enamels and lacquers. Tropical Paint Co., Cleveland, O.
Tru-Air—Air conditioning units, surface, systems, condensers, cooling towers, eliminators, exchangers, heaters. Blazer & Son, M., Passaic, N. J.
Truco—Drills. Wheel Trueing Tool Co., Detroit, Mich.
True Heat—Radiation. Pacific Steel Boiler Div., National-U.S. Radiator Corp., Johnstown, Pa.
True-Pitch Level—Tools. Dreier Bros., Inc., Chicago, Ill.
Truespot—Testers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Truflex—Drives, v-belts. Gates Rubber Co., The, Denver, Colo.
Tru-Grip—Pulleys and sheaves. Gates Rubber Co., Denver, Colo.
Truk-Cel—Unit coolers. Dole Refrigerating Co., Chicago, Ill.
Truliradiant—Gas burners. Sullivan Valve & Engineering Co., Butte, Mont.
Tru-Perimeter—Heating systems. Webster & Co., Warren, Camden, N. J.
Tru-Set—Fasteners. Ramset Fastening System, Winchester-Western Div., Olin-Mathieson Chemical Corp., Cleveland, O.
Try-Me—Regulators, filters, strainers, valves. Tryco Products, Inc., Westfield, Mass.
Tube-alloy—Electrodes. McKay Co., Pittsburgh, Pa.
Tubecote—Protective coatings. Wilhelm Co., A., Reading, Pa.
Tuff-Bond—Adhesives, cement, insulation. Moore Inc., Goodloe E., Danville, Ill.
Tufflex—Bases and pads, insulation. Wood Conversion Co., St. Paul, Minn.
Tuf-flex—Gage and sight glasses. Libbey-Owens-Ford Glass Co., Toledo, O.
Tuft-Weld—Fasteners, hangers. Moore Inc., Goodloe E., Danville, Ill.
Tuf-On—Protective coatings. Brooklyn Paint & Varnish Co., Inc., Brooklyn, N. Y.
Tulox—Tubing. Extruded Plastics, Inc., Norwalk, Conn.
Tumblin—Bolts. Star Expansion N. Y., Inc., New York, N. Y.
Turbinair—Motors. Joy Mfg. Co., Pittsburgh, Pa.
Turbo—Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis.
Turbo-Aire—Overfire air jets, smoke alarms. Canton Stoker Corp., Canton, O.
Turbo-Fire—Burners. Gordon & Piatt, Inc., Winfield, Ks.
Turbo Vane—Fans and blowers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Turbulaire—Dryers. Western Precipitation Corp., Los Angeles, Calif.
Turcoat—Coatings. Turco Products, Inc., Los Angeles, Calif.
Twindow—Heat insulating windows. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Twin G-Fin—Preheaters. Griscom-Russell Co., Massillon, O.
Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.
Two-Tank-I—Oil burner filters. Barclay, Inc., Robert, Chicago, Ill.
Tygon—Protective coatings, plastic tubing. United States Stoneware Co., New York, N. Y.
Tygon—Protective coatings, plastic tubing. United States Stoneware Co., Plastics & Synthetics Div., Akron, O.
Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.
Tyte-Unyte—Cement and compounds. Whitlam Mfg. Co., J. C., Wadsworth, O.

U-Brand—Fittings. Union Malleable Mfg. Co., Ashland, O.
USG—Louvers and shutters. United States Gypsum Co., Chicago, Ill.
U. S. S.—Angles, sheets. United States Steel Co. Pittsburgh, Pa.
U. S. S.—Pipe, tubing. National Tube Div., United States Steel Corp., Pittsburgh, Pa.
U-S-S—Sheets, angles. Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
U. S.—Valves. Powell Co., Wm., The, Cincinnati, O.
UXLD—Regulators. Duro-Dyne Corp., New Hyde Park, Long Island, N. Y.
Ucilon—Protective coatings, enamels and lacquers, high temperature paint. Metal & Thermit Corp., Rahway, N. J.
Ucon—Lubricants, oils. Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
U-Cote—Pipe fittings. Union Malleable Mfg. Co., Ashland, O.
Ugasco—Gaskets. United States Gasket Co., Camden, N. J.
Ultra-Aire—Filters. Mine Safety Appliances Co., Pittsburgh, Pa.
Ultrafine—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Ultralite—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Unarco—Insulation, gaskets, packing, insulating cement, condensers, heaters, radiation, surface cooling & heating, air conditioning units. Union Asbestos & Rubber Co., Chicago, Ill.
Unbrako—Parts for heating & air conditioning equipment, socket screws. Standard Pressed Steel Co., Jenkintown, Pa.
Uni-Built—Pumps. Bell & Gossett Co., Morton Grove, Ill.
Uni-cast—Motors. Redmond Co., Inc., Owosso, Mich.
Unichrome—Protective coatings, electrolytic devices, enamels and lacquers, tank linings. Metal & Thermit Corp., Rahway, N. J.
Uniclosed—Electric motors. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Unicoils—Finned surfaces. Clarage Fan Co., Kalamazoo, Mich.
Unicon—Refrigerating condensers. Kramer Trenton Co., Trenton, N. J.
UNIFIL—Connectors. Scully Signal Co., Melrose, Mass.
Uniflare—Fittings. Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Uni-Flo Air Valves—Valves. Barber-Colman Co., Rockford, Ill.
Uni-flo—Diffusers, grilles, mixing units, regulators, registers. Barber-Colman Co., Rockford, Ill.
Uniflow—Oil burners. Ace Engineering Co., Chicago, Ill.
UniMatic—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.
Unimount—Pumps. March Mfg. Co., Inc., Skokie, Ill.
Union—Valves. Powell Co., Wm., The, Cincinnati, O.
Union—Incinerators. Syrall Mfg. Co., Syracuse, N. Y.
Unipack—Welding fume exhausters, centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Unipar—Cement and compounds. Rubber Products Div., Parker-Hannifin Corp., Cleveland, O.
Unipump—Pumps. Weinman Pump Mfg. Co., Columbus, O.
Unishear—Shears. Stanley Works, The, New Britain, Conn.
Unishears—Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Uni-Silencer—Absorbers. Elof Hansson, Inc., Acoustical Div., New York, N. Y.
Unisorb—Bases and pads. Felters Company, The, Boston, Mass.
Unistage—Aftercoolers. Schramm, Inc., West Chester, Pa.
UniStoker—Stokers. Detroit Stoker Co., Monroe, Mich.
Uni-Strainer—Strainers. Perfecting Service Co., Charlotte, N. C.
Unitair—Air compressors. Joy Mfg. Co., Pittsburgh, Pa.
Unitaire—Air conditioning units. Westinghouse Electric Corp., Air Conditioning Div., Staunton, Va.
Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.
Unitherm—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Unit Fin—Radiation. Vapor Heating Corp., Chicago, Ill.
Unitite—Valves. Hanna Engineering Wks., Chicago, Ill.
Unit-Line—Pumps. Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., Pasadena, Calif.
UniTrane—Air conditioning units and coolers. Trane Co., The, La Crosse, Wis.
Uni-Trap—Steam traps. Perfecting Service Co., Charlotte, N. C.
Unitrol—Boards. Cutler-Hammer, Inc., Milwaukee, Wis.
Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.
Universal—Cast iron pipe. Central Foundry Co., Newark, N. J.
Universal—Centrifugal pumps. Valve & Gossett Co., Morton Grove, Ill.
Universal—Gas and oil burners. Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., Los Angeles, Calif.
Universal—Packing. Johns-Manville, New York, N. Y.
Universal—Pumps. Wright Mfg. Co., Phoenix, Ariz.
Universal—Regulators. Dockson Corp., Detroit, Mich.
Universal CP—Drills. Chicago Pneumatic Tool Co., New York, N. Y.
Universal Unaflow—Engines. Skinner Engine Co., Erie, Pa.
Univers-L-Mount—Pumps. March Mfg. Co., Inc., Skokie, Ill.
Uni-Wash—Dust collectors. Newcomb-Detroit Co., Detroit, Mich.
Uno Turbine—Ventilators. Uno Ventilator Co., Malden, Mass.
Uno Venturette—Ventilators. Uno Ventilator Co., Malden, Mass.
Urefoam—Insulating cement, pipe insulation. Atlas Mineral Products Co., Mertztown, Pa.
Urethane—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
UsAIRco—Air conditioning equipment, blowers, condensers, surfaces, heaters. United States Air Conditioning Corp., Philadelphia, Pa.
Uscolite—Plastic pipe, fittings, plastic valves. United States Rubber Co., New York, N. Y.
Us-kon—Conductors. United States Rubber Co., New York, N. Y.
Util-i-Torch—Torches. Turner Brass Works, The, Sycamore, Ill.
Utilitube.—Aluminum tubing. Aluminum Co. of America, Pittsburgh, Pa.
Utility—Blowers. American Blower Corp., Detroit, Mich.
Utility—Roof ventilators. Arex Co., Chicago.
Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

VB Reflecto-Batt—Insulation. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
VER—Air conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
VL-5—Lubricants. Jet-Lube, Inc., Burbank, Calif.
V Line—Tools. Millers Falls Co., Greenfield, Mass.
VP-Ex—Ventilators. New York Blower Co., Chicago, Ill.
VRC—Air Conditioning units. Drayer-Hanson, Div. of National U. S. Radiator Corp., Los Angeles, Calif.
VRS—Air conditioning units. Unarco Air Conditioning Products, Heating & Air Conditioning Div., National-U.S. Radiator Corp., Johnstown, Pa.
V*S—Changers. Reliance Electric & Engineering Co., Cleveland, O.
Vacu-Flo—Fittings. H-P Products, Inc., Louisville, O.
Vacumatic—Ejectors, pumps. Whittington Pump & Engineering Corp., Indianapolis.
Vacuum Cold Plate—Coils and panels. Dole Refrigerating Co., Chicago, Ill.

Vacuumstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Valcalox—Dampers, regulators. Young Regulator Co., Cleveland, O.
Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.
Valvatrol—Valves, diaphragm. Squires Co., C. E., The, Cleveland, O.
Valvent—Roof ventilators. Swartwout Co., Cleveland, O.
Valvrator—Valves. Fischer & Porter Co., Hatboro, Pa.
Vanco—Louvers and shutters. Van Noorden Co., E., Boston, Mass.
Vanco Exhaustmaster—Ventilators. Van Noorden Co., E., Boston, Mass.
Vanco "QR"—Ventilators. Van Noorden Co., E., Boston, Mass.
Vanco Simplex—Ventilators. Van Noorden Co., E., Boston, Mass.
Vanco Upblast—Ventilators. Van Noorden Co., E., Boston, Mass.
Van Cor—Ducts and duct fittings, plastic pipe fittings, plastic pipe, plastic sheets, valves, pipe nipples, pipe flanges, tank linings, tanks. Colonial Plastics Mfg. Co., Industrial Div., Cleveland, O.
Vapco—Compounds. Garman Co., Inc., The, St. Louis, Mo.
Vapco-Phos Nuggets—Water treatment. Garman Co., Inc., The, St. Louis, Mo.
Vapco Slime-X—Water treatment. Garman Co., Inc., The, St. Louis, Mo.
Vape-Sorber—Filters. Selas Corp. of America, Dresher, Pa.
Vapomatic—Hot gas defrosting systems. Recold Corp., Los Angeles, Calif.
Vaporene—Compound and water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Vapor-Clarkson—Heating and process boilers. Vapor Heating Corp., Chicago, Ill.
Vaporstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Vapowall—Insulation. MMM, Inc., Portsmouth, O.
Vari-Basic—Fan housings. Torrington Mfg. Co., The, Torrington, Conn.
Varidrive—Speed changers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Vari-Pitch—Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Vari-Speed Drives—Speed changers. Reeves Pulley Co., Div. of Reliance Electric & Engineering Co., Columbus, Ind.
Vari-Temp—Air conditioning units. Dunham-Bush, Inc., West Hartford, Conn.
Vari-Vac—Heating systems, control systems. Dunham-Bush, Inc., West Hartford, Conn.
Vaultmaster—Air conditioning units. Haertel Co., Walter, Minneapolis, Minn.
Vcon—Oil. Union Carbide Chemicals Co., Div. of Union Carbide Corp., New York, N. Y.
Veco—Analyzers, combustion testing kits, Recorders, thermometers. Victory Engineering Corp., Union, N. J.
Veeco—Leak detectors. Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Vee Jet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Veelos—V-belts. Manheim Mfg. & Belting Co., Manheim, Pa.
Velometer—Air velocity meters. Illinois Testing Laboratories, Inc., Chicago.
Velvetrol—Valves. J. D. Gould Co., Indianapolis, Ind.
VENTALARM—Alarms, gages. Scully Signal Co., Melrose, Mass.
Ventbestus—Connections, duct, flexible. Ventfabrics, Inc., Chicago, Ill.
Ventfab—Flexible duct connections. Ventfabrics, Inc., Chicago, Ill.
Ventflo—Valves. Quality Specialty Co., Inc., Camden, N. J.
Ventglas—Connections, duct, flexible. Ventfabrics, Inc., Chicago, Ill.
Ventlok—Doors and panels, parts for heating and air conditioning equipment. Ventfabrics, Inc., Chicago, Ill.
Vento—Traps. Haines & Co., Wm. S., Div. Sellers Injector Corp., Philadelphia.
Ventura—Fans. American Blower Corp., Detroit, Mich.
Venturafin—Unit heaters. American Blower Corp., Detroit, Mich.
Venturi—Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.
Venturi—Meters, nozzles. Builders-Providence, Inc., Div. of B-I-F Industries Inc., Providence, R. I.
Venturi-Flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Venturi One—Fittings. Taco Heaters, Inc., Cranston, R. I.
Venturi-Top—Caps, roof ventilators. Walker Mfg. & Sales Co., St. Joseph, Mo.
Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.
Ventyvinyl—Connections. Ventfabrics, Inc., Chicago, Ill.
Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Verithin-Microrold—Steel sheets. Washington Steel Corp., Washington, Pa.
Vermiculite—Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Vertex—Paint. Whitlam Mfg. Co., J. C., Wadsworth, O.
Verti-Flow—Cooling towers. Havens Cooling Towers, Div. of Havens Structural Steel Co., Kansas City, Mo.
Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.
V-Flat—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vibracork—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibraducer—Absorbers. Atlantic Metal Hose Co., Inc., New York, N. Y.
Vibra Free—Absorbers. Williamson Co., The, Cincinnati, O.
Vibraglass—Bases and pads. L. O. F. Glass Fibers Co., Toledo, O.
Vibra grate—Stokers. American Engineering Co., Philadelphia, Pa.
Vibra-Joint—Pipe joints. Saussé & Co., M. W., Los Angeles, Calif.
Vibrashock—Bases and pads. Robinson Aviation, Inc., Teterboro, N. J.
Vibra-sorber—Vibration absorbers. Flexonics Corp., Maywood, Ill.
Vibrastop—Duct connections. Grant Wilson, Inc., Chicago, Ill.
Vibration Eliminators—Adsorbers. American Metal Hose Div., American Brass Co., Waterbury, Conn.
Vibrex—Bases and pads, hangers and supports. Saussé & Co., M. W., Los Angeles, Calif.
Vibro-Hangers—Pipe hangers and supports, absorbers. Korfund Co., Inc., Long Island City, N. Y.
Vibro Insulators—Bases. Goodrich Industrial Products Co., Akron, O.
Vibro-Isolators—Bases and pads, vibration absorbers. Korfund Co., Inc., Long Island City, N. Y.
Vichrome—Coatings, enamels. Interchemical Corp., Finishes Div., Newark, N. J.
Victor—Water heaters. Cleveland Heater Co., Inc., Cleveland, O.
Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Viking—Welders. Mid-States Welder Mfg. Co., Chicago, Ill.
V-in-Tah—Paint. Valdura Div., American-Marietta Co., Chicago, Ill.
Vim—Belting, gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.
Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Vinsynite—Coatings. Thompson and Co., Oakmont, Pa.
Vinyl—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
Vinylgrip—Adhesives for pipe covering. Adhesive Products Corp., New York, N. Y.
Visaflame—Controls. Mercoid Corp., The, Chicago, Ill.
Viscograph—Viscosimeters. Brabender Corp., Rochelle Park, N. J.
Viscorator—Viscosimeters. Fischer & Porter Co., Hatboro, Pa.
Visi-Flo—Sight glasses for pipe lines. Jordan Corp., Div. of OPW Corp., Cincinnati, O.
Visi-Float—Air filter gages. F. W. Dwyer Mfg. Co., Michigan City, Ind.
Viso Flo—Sight glasses. O P W Corp., Cincinnati, O.
Visoleak—Leak detectors. Allin Mfg. Co., Chicago, Ill.
Vitalic—Hose. Continental Rubber Wks., Erie, Pa.
Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.
Vitreon—Pipe. Robinson Clay Products Co., Inc., The, Akron, O.
Vitricel—Refractories. Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Vitriram—Furnace cement. United States Stoneware Co., New York N. Y.
Vitroliner—Pipe and fittings, stacks and chimneys. Condensation Engineering Corp., Chicago, Ill.
Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.
V-Meth-L—Refrigerants. Virginia Smelting Co., West Norfolk, Va.
Voladjuster—Dampers. Barber-Colman Co., Rockford, Ill.
Volcano—Ventilators. Iwan Brothers, South Bend, Ind.
Vol-O-Flo—Meters. National Instrument Laboratories, Inc., Riverdale, Md.
Vornado—Fans, air conditioning units. Sutton Corp., O. A., The, Wichita, Kans.
Vortex—Pumps. Lawrence Pump and Engine Co., Lawrence, Mass.
V-to-V—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vulcalock—Linings, tank; lined fittings, pipe and valves, adhesives. Goodrich Industrial Products Co., B. F., Akron, O.
Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcan—Stokers. Canton Stoker Corp., Canton, O.
Vulcan Superior—Tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulco—Pulleys. Gates Rubber Co., Denver, Colo.
Vulco Ropes—Belts, drives. Gates Rubber Co., Denver, Colo.
Vulcomount—Pulleys. Gates Rubber Co., Denver, Colo.
Vyflex—Tank linings. Kaykor Industries, Inc., Yardville, N. J.

W. & McD.—Strainers. Watson & McDaniel Co., Philadelphia, Pa.
WMT—Cooling towers. Drayer-Hanson, Div. of National-U.S. Radiator Corp., Los Angeles, Calif.
WS—Valves. Powell Co., Wm., The, Cincinnati, O.
W & T—Chlorinators, feeders, gages, indicators. Wallace & Tiernan Inc., Belleville, N. J.
W.T.E.—Boilers. Murray Iron Works, Co., Burlington, Ia.
WTP—Boilers. Titusville Iron Wks. Co., The, Titusville, Pa.
W & W—Pipe hangers. Western Wire Products Co., St. Louis, Mo.
Wadco—Oil. Whitlam Mfg. Co., J. C., Wadsworth, O.
Waikiki—Heaters. Vapor Heating Corp., Chicago, Ill.
Wakefield—Coils, fittings, pipe, pumps, tanks and valves. Lead Lined Iron Pipe Co., Wakefield, Mass.
Walco-Parmelee—Wrenches. Walworth Co., New York, N. Y.
Walltube—Radiator brackets, or hangers. Arjac Products Inc., Rochester, N. Y.
Walseal—Fittings, valves. Walworth Co., New York, N. Y.
Walvector—Radiation. Webster & Co., Warren, Camden, N. J.
Warco—Fuel oil treatment. Warren Refining & Chemical Co., The, Cleveland, O.
Warcolite—Enamels and lacquers. Warren Refining & Chemical Co., The, Cleveland.
Warnock—Wrenches. Lowell Wrench Co., Worcester, Mass.
Watch Dog—Meters. Worthington-Gamon Meter Div., Worthington Corp., Newark, N. J.
Watco—Cooling towers, systems. Water Cooling Corp., New York, N. Y.
Water-Boy—Feeders, alarms, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Water-King—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Water Master—Filters. Austin Engineering & Mfg. Co., Inc., Ysleta, Tex.
Water-Mund—Heaters. Western Boiler Co., Los Angeles, Calif.
Waterspar—Enamels and lacquers, Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Wa-Trol—Regulators. Thermal Agency, Houston, Tex.
Way Loctor—Doors and panels. Walsh Co., The, L. M., Boston, Mass.
Wear-Arc—Electrodes. Alloy Rods Co., York, Pa.
Wear-Arc "Super WH"—Electrodes. Alloy Rods Co., York, Pa.
Wear-O-Matic—Electrodes. Alloy Rods Co., York, Pa.
Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Weather—Protective coatings. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Weather-Analoy—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Weather-Chron—Switches, control systems, regulators, thermostats. Automatic Devices Co., Inc., Western Springs, Ill.
Weather-Damper—Regulators. Automatic Devices Co., Inc., Western Springs, Ill.
Weather-Flo—Thermostats, control systems, heating systems, regulators. Automatic Devices Co., Inc., Western Springs, Ill.
Weathermaker—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weather-Man—Regulators, thermostats, control systems. Automatic Devices Co., Inc., Western Springs, Ill.
Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Weatherwise—Air conditioning units. Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Webco-Ray—Boilers. Western Boiler Co., Los Angeles, Calif.
Weber's—Insulation. Forty-Eight Insulations, Inc., Aurora, Ill.
Weco—Plugs, steel unions. Chiksan Co., Brea, Calif.
Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa.
Wedge-Lock—Pipe, fittings. Robinson Clay Product Co., The, Akron, O.

Wedgeplug—Valves. Stockham Valves & Fittings, Birmingham, Ala.
Weir—Stokers. Meyer Furnace Co., The, Peoria, Ill.
Weir-Meyer—Furnaces, heaters. Meyer Furnace Co., The, Peoria, Ill.
Weldaluminite—Welding compounds. Special Chemicals Corp., Ossining, N. Y.
Weldanpower—Welders. Lincoln Electric Co., The, Cleveland, O.
Weldells—Welding fittings. Taylor Forge & Pipe Works, Chicago, Ill.
Weld-Ends—Couplings. Wachs Co., E. H., The, Chicago, Ill.
Weld-Ends—Pipe couplings, fittings. Pipe Line Development Co., Cleveland, O.
Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.
Weldrawn—Tubing. Superior Tube Co., Norristown, Pa.
Weldreel—Welders, welding and cutting apparatus. United Specialties, Inc., El Dorado, Ark.
Western—Fans, furnaces, heaters. Tuck-Aire Furnace Co., San Francisco, Calif.
Westernaire—Fans. Western Engineering & Mfg. Co., Venice, Calif.
Western Roll-Bond—Heat exchangers. Olin Mathieson Chemical Corp., Metals Div., New York, N. Y.
West-Flex—Hose. Flexible Metal Hose Mfg. Co., Costa Mesa, Calif.
Wevelite—Insulation. Insulite Div., Minnesota & Ontario Paper Co., Minneapolis, Minn.
Whiffletree—Valves. Dahl, G. W., Bristol, R. I.
Whirlclad—Coatings. Polymer Corp., The, Reading, Pa.
Whirlcone—Spray nozzles. Water Cooling Equipment Co., St. Louis, Mo.
Whirljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
White Star—Valves. Powell Co., Wm., The, Cincinnati, O.
Wig-O-Flex—Couplings. Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Wigwam Thermcap—Vent flue caps. Boston Machine Works Co., Lynn, Mass.
Wilco—Bi-metals. Wilson Co., H. A., The, Union, N. J.
Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Wind-A-Clamp—Hose clamps. Manufacturers Corp., Mansfield, O.
Windial—Anemometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore.
Windmaster—Fans. Acme Equipment Co., Muskogee, Okla.
Wind-O-Cool—Fans. Belco Industries, Inc., St. Louis, Mo.
Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans.
Wingfoil—Exhausters, fans. Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Wingjet—Ventilators. Wing Mfg. Co., L. J., Div. of Aero Supply Mfg. Co., Inc., Linden, N. J.
Winkler—Burners, boilers, furnace, stokers, air conditioning units. Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.
Wissco—Grilles. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Witch—Bolts, clamps, hangers, inserts, protectors. Carpenter & Paterson, Inc., Cambridge, Mass.
Wolf-Linde—Condensers, compressors, fittings, flanges, strainers, valves. Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Wondaire—Heaters, furnaces. Cox Mfg. Co., Ridgeville, Ind.
Wonder—Pipe benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.
Wondercote Alkyd—Enamels and lacquers. Sonneborn Sons, Inc., L., Building Products Div., New York, N. Y.
Wonderglas—Heaters. Hotstream Co., Cleveland, O.
Wurtzilite—Coatings. Ohmlac Paint & Refining Co., Inc., Long Island City, N. Y.

X-L—Gaskets, packing. Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
Xyron—Electrodes. Eutectic Welding Alloys Corp., Flushing, N. Y.

YAC—Air conditioning units. Young Radiator Co., Racine, Wis.
Yager's—Solder. Benson Co., Inc., Alex R., New Hartford, N. Y.
Yarway Fine Screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Gun-Pakt—Expansion pipe joints. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Hi-Lo—Alarms. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Hi-Lo-Graph—Recorders. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Holtite—Pipe repair clamps. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Impulse—Steam traps. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Remote—Indicators. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Seatless—Valves. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Unit-Tandem—Valves. Yarnall-Waring Co., Philadelphia, Pa.
Yarway Welbond—Valves. Yarnall-Waring Co., Philadelphia, Pa.
Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.
Yorkaire—Unit air coolers. York Corp., Subsidiary of Borg-Warner Corp., York, Pa.
Yulatrol—Fuel oil preheaters, leak detectors. Yula Water Heaters, Inc., Bronx, N. Y.

Zaflo—Enamels and lacquers. Glidden Co., Nubian Div., Chicago, Ill.
Zaponite—Enamels and lacquers. Glidden Co., Nubian Div., Chicago, Ill.
Zatex—Enamels and lacquers. Glidden Co., Nubian Div., Chicago, Ill.
Z-Crete—Pipe and concrete insulation. Zonolite Co., Chicago, Ill.
Zebogene—Treatment. Berna Corp., Garwood, N. J.
Zephyrcon—Condensers. Larkin Coils, Inc., Atlanta, Ga.
Zero—Cement, refractories. Standard Fuel Engineering Co., Detroit, Mich.
Zerolite—Pipe insulation. Johns-Manville, New York, N. Y.
Zeropaks—Coolers. McQuay, Inc., Minneapolis, Minn.
Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.
Zinaloy—Zinc sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
ZINCGRIP—Sheets. Armco Steel Corp., Middletown, O.
Zincilate—Coatings. Industrial Metal Protectives, Inc., Dayton, O.
Zincoater—Coatings. Tropical Paint Co., Cleveland, O.
Zinc Soot—Soot destroyers. Tamms Industries Co., Chicago, Ill.
Zip Dyeline Inspector—Piping leak detectors. Zaco Labs., Div. of Zip Abrasive Co., Cleveland, O.
Zipper—Welders. Mid-States Welder Mfg. Co., Chicago, Ill.
Zip-Portable—Welders. Mid-States Welder Mfg. Co., Chicago, Ill.
Zip Speed Lacquer—Identification markers. Zaco Labs., Div. of Zip Abrasive Co., Cleveland, O.
Zircon—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
Zone-Pac—Heating systems. Barber-Colman Co., Rockford, Ill.
Zonetrol—Systems. Crise Controls Div., Acro Mfg. Co., The, Columbus, O.
Zytel—Plastics, powder and resins. duPont de Nemours & Co., E. I., Polychemicals Dept., Wilmington, Del.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRIAL AND ALL OTHER LARGE BUILDINGS

PART 4 — ALL MANUFACTURERS' ADDRESSES

A

A. & A. Register Co., 8327 Clinton Rd., Cleveland 9, O.
ABC-Federal Oil & Burner Co., Inc., 2210 Walnut St., Philadelphia 3.
ACEC Electric Corp., 40 E. 49th St., New York 17, N. Y.
A.C.M.I. Borescope Div., American Cystoscope Makers, Inc., 8 Pelham Parkway, Pelham Manor, N. Y.
A'G'A Div. of Elastic Stop Nut Corp. of America, 1027 Newark Ave., Elizabeth 3, N. J.
A-J Mfg. Co., 3601 E. 18th St., Kansas City 27, Mo.
A-P Controls Div., Controls Co. of America, 2450 N. 32nd St., Milwaukee 45, Wis.
A.R.A. Mfg. Co., 1041 Foch St., Ft. Worth, Tex.
Abart Gear & Machine Co., 4828-36 W. 16th St., Chicago 50, Ill.
Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica 32, N. Y.
Abbott & Biddle Co., 2413 Federal St., Philadelphia 46, Pa.
Able Metal Spinning & Stamping Co., 2009 Nameoke Ave., Far Rockaway 91, N. Y.
Accurate Sheet Metal & Mfg. Works, 2336-44 Milwaukee Ave., Chicago 47, Ill.
Accurate Specialties Co., Inc., 9-01 43rd Ave., Long Island City, N. Y.
Ace Co., The, 112 W. Washington St., P. O. Box 1212, Ocala, Fla.
Ace Engineering Co., 2850 W. Harrison, Chicago 12, Ill.
Ace Instrument Co., Inc., 172 Pacific St., Brooklyn, N. Y.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Corp., P. O. Box 3117, No. Sta. P. O., Meridian, Miss.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Corp., Cuba, N. Y.
Acme Electric Heating Co., 1217 Washington St., Boston 18, Mass.
Acme Electric Welder Co., 2618 Fruitland Ave., Los Angeles 58, Calif.
Acme Equipment Co., 205-13 E. Broadway, Muskogee, Okla.
Acme Industries, Inc., 600 N. Mechanic St., Jackson, Mich.
Acme Mfg. Co., 7500 State Rd., Philadelphia 36, Pa.
Acme Newport Steel Co., Ninth & Lowell Sts., Newport, Ky.
Acme Steel Co., 135th St. & Perry Ave., Chicago 27, Ill.
Acme Welding Div. of the United Tool & Die Co., 1031 New Britain Ave., West Hartford, Conn.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acro Welder Mfg. Co., 1719 W. St. Paul Ave., Milwaukee 3, Wis.
Adam Electric Co., Frank, 3648 Windsor Pl., St. Louis 13, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 468 Park Dr., Buffalo 17, N. Y.
Adams Mfg. Co., 1530 St. Clair Ave., Cleveland 14, O.
Adams Pipe Repair Products, 2453 Merced Ave., P. O. Box 111, El Monte, Calif.
Addison Products Co., Addison, Mich.
Adelta Mfg. Co., Inc., 21 & Ellsworth, Philadelphia 46, Pa.
Adhesive Products Corp., 1660 Boone Ave., New York 60, N. Y.
Adjustable Clamp Co., 417 N. Ashland Ave., Chicago 22, Ill.
Admiral Corp., 3800 Cortland St., Chicago 47, Ill.
Admiral Engineering Co., Inc., 900 W. Erie St., Chicago, Ill.
Adre Co., The, 8980 Hawthorne Lane, Hales Corner 3, Wis.
Adsco Div., Yuba Consolidated Industries, Inc., Buffalo, N. Y.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Furnace Co., 2300 E. Douglas, Wichita 7, Kans.
Advance Industries, Inc., 640 Memorial Dr., Cambridge 39, Mass.
Advance Pump Co., 2531 9th St., Berkeley, Calif.
Advance Relays, Product of Electronics Div., Elgin National Watch Co., 366 Bluff City Blvd., Elgin, Ill.
Aemco Inc., 10 State St., Mankato, Minn.
Aerco Corp., Northvale, N. J.
Aerofin Corp., 101 Greenway Ave., Syracuse 3, N. Y.
Aeroil Products Company, Inc., 69 Wesley St., South Hackensack, N. J.
Aeroprojects, Inc., West Chester, Pa.
Aeroquip, Inc., 1225 W. Main St., Van Wert, O.
Aeroquip Corp., Western Div., 3015 Winona Ave., Burbank, Calif.
Aeroquip Corp., 300 S. East Ave., Jackson, Mich.
Aerotec Corp., The, Greenwich, Conn.
Aerotech Specialties, Inc., Glastonbury, Conn.
Aerovent Fan Co., Inc., Ash and Barlow Sts., Piqua, O.
Aetna Ball & Roller Bearing Co., Div. Parkersburg-Aetna Corp., 4600 W. Schubert, Chicago, Ill.
Afco Fitting Co., Div. of Curtis Mfg. Co., 11830 Brookpark Rd., Cleveland 30, O.
Agava Products, Inc., 34 Exchange Pl., Jersey City 2, N. J.
Aget Mfg. Co., 1408 E. Church St., Adrian, Mich.
Agnew & Tomlinson, 51-04 Vernon Blvd., Long Island City 1, N. Y.
Ahlberg Bearing Co., 3025 W. 47th St., Chicago 32, Ill.
Airaterra (Roylyn Products), 620 Paula Ave., Glendale 1, Calif.
Air-Con Filter Co., 5079 Summer Rd., Memphis, Tenn.
Air Conditioning Engineering Co., 44 First St., Cambridge 41, Mass.
Air Conditioning Equipment Corp., 219 E. 44th St., New York, N. Y.
Air Conditioning Products Co., 2340 W. Lafayette Blvd., Detroit 16.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, O.
Air-Cooling Engineering Co., P. O. Box 744, Evanston, Ill.
Air Devices, Inc., 185 Madison Ave., New York 16, N. Y.
Air Distribution Products Co., 116 S. LaBrea Ave., Los Angeles 36, Calif.
Air Equipment Co., 2730 Zuni St., Denver, Colo.
Air-Factors, Inc., 1624 S. Raymond Ave., Monrovia, Calif.
Airfan Engineering Co., 7401 Telegraph Rd., Los Angeles 22, Calif.
Air Filter Corp., 4554 West Woolworth Ave., Milwaukee 18, Wis.
Airfloor Co. of California, Inc., 13729 East Rosecrans Blvd., Norwalk, Calif.
Air-Net Appliance Corp., 1340 E. 55th St., Chicago 15, Ill.
Air Reduction Co., Inc., Socony-Mobil Bldg., 150 E. 42nd St., New York 17, N. Y.
Air & Refrigeration Corp., 439 Madison Ave., New York 22, N. Y.
Aireactor Corp., 22 E. 40th St., New York 16, N. Y.
Aire-Foile Fan & Blower Co., 10047 West Fort, Detroit 9, Mich.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airguide Instrument Co., 2210 Wabansia Ave., Chicago 47, Ill.
Airjet Ventilator Co., 133 Industrias, San Clemente, Calif.
Airkem, Inc., 241 E. 44 St., New York 17, N. Y.
Airmaster Corp., 1801 W. Belle Plaine Ave., Chicago, Ill.
Airmatic Valve, Inc., 7317 Associate Ave., Cleveland 9, O.
Air-Maze Corp., 25000 Miles Rd., Cleveland 28, O.
Air-Path Products Co., 4620 Doll Ave., Baltimore 15, Md.
Air Purification Service, Inc., 136 Liberty St., New York, N. Y.
Airserco Mfg. Co., Inc., 435 Melwood St., Pittsburgh 13, Pa.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
Airtemp Construction, Div. of Chrysler Corp., 1600 Webster, Dayton, O.
Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airtron Corp., Holland, O.
Airwasher Corp., Eaton Rapids, Mich.
Ajax Boiler & Heater Co., 1519 W. 132nd St., Gardena, Calif.
Ajax Corp. of America, 2509 Washington Ave., Evansville, Ind.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., 216-220 E. Front St., Cincinnati 2, O.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Alabama Pipe Co., Anniston, Ala.
Aladdin Heating Corp., 1111 West Ave., 137, San Leandro, Calif.
Alan Wood Steel Co., Conshohocken, Pa.
Albert Pipe Supply Co., Berry & N. 13th, Brooklyn, N. Y.
Albertson & Co., Inc., 3100 Lowell St., Sioux City 2, Ia.
Alco Products, Inc., Schenectady 5, N. Y.
Alco Refrigeration Sales & Service, Inc., 3952 St. Clair Ave., Cleveland, O.
Alco Valve Co., 865 Kingsland Ave., St. Louis 5, Mo.
Aldrich Co., 105 E. Williams St., Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
Aljon Mfg. Co., Inc., 54-18 43rd St., Maspeth 78, N. Y.
Allcraft Mfg. Co., 27 Hayward St., Cambridge, Mass.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.
Allegheny Valve Co., 349 Pennsylvania Ave. W., Warren, Pa.
Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis.
Allen Co., Inc., L. B., 9307 Berenice, Schiller Park, Ill.
Allen Co., Robert G., P. O. Box 110, Mechanicsville, N. Y.
Allen Cooler & Ventilator, Inc., 704 Woodward, Rochester, Mich.
Allen Mfg. Co., W. D., 566 W. Lake St., Chicago 6, Ill.
Alliance Mfg. Co., Inc., Alliance, O.
Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y.
Allied Porcenell, Inc., 6641 S. Narragansett Ave., Chicago 38, Ill.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 25, Ind.
Allin Mfg. Co., 410 N. Hermitage Ave., Chicago, Ill.
Allington & Curtis Mfg. Co., 1800 Holland Ave., Saginaw, Mich.
Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee 1, Wis.
Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 1, Wis.
Allmetal Screw Products Co., Inc., 821 Stewart Ave., Garden City, Long Island, N. Y.
Alloy Propeller, Zelienople, Pa.
Alloy Rods Co., Lincoln Highway West, York, Pa.
Alloy Stainless Products Co., Union Blvd., Totowa, N. J.
Alloy Steel Products Co., 1322 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Almar Hydraulic Valve Co., 10011 Meech Ave., Cleveland 5, O.
Alpha Metals, Inc., 56 Water St., Jersey City, N. J.
Alpha Plastics, Inc., 78 Okner Pkwy., Livingston, N.J.
Alphil Spot Welder Mfg. Corp., 1058 Pacific St., Brooklyn, N. Y.
Alstrom Corp., The, 790 E. 176 St., New York 60, N. Y.
Alter Co., Harry, 1717 S. Wabash Ave., Chicago, Ill.
Alton Mfg. Co., 1112 Ross Ave., Dallas 2, Tex.

Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.
Aluminum Products, Inc., Fort Lauderdale, Fla.
Aluminum Tubing Co., 2961 Old Kings Road, P. O. Box 1234, Jacksonville, Fla.
Aluminum Wool Div., Carey Electronic Engineering Co.. 1880 Clifton Ave., Springfield, O.
Alumiseal Corp., 429 E. 53rd St., New York 22, N. Y.
Amana Refrigeration, Inc., Amana, Ia.
Amco Plastic Pipe Co., 2002 Davis St., San Leandro, Calif.
Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.
American Agile Corp., P. O. Box 168, Bedford, O.
American Air Curtain Corp., 10408 Manchester Rd., St. Louis 22, Mo.
American Air Filter Co., Inc., 373 Central Ave., Louisville 8, Ky.
American Air Filter Co., Inc., Herman Nelson Products, 215 Central Ave., Louisville 8, Ky.
American Boa, Inc., 114 Liberty St., New York, N.Y.
American Blow Pipe Co., 3549 W. Cermak Rd., Chicago 23, Ill.
American Blower Corp., Detroit 32, Mich.
American Brass Co., 414 Meadow St., Waterbury 20, Conn.
American Car & Foundry Div. of ACF Industries, Inc., 30 Church St., New York 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Chemical Paint Co., Brookside Ave., Ambler, Pa.
American Coal Burner and Wood Stoker Corp., 1133 W. Cornelia Ave., Chicago 13, Ill.
American Coils Co., Route 524, Lakewood Rd., Farmingdale, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Wheatsheaf Lane & Sepviva St., Philadelphia 37, Pa.
American Felt Co., Glenville, Conn.
American Flange & Mfg. Co., Inc., 30 Rockefeller Plaza, New York 20.
American Flexible Coupling Div., Zurn Industries, Inc., 1810 Pittsburgh Ave., Erie, Pa.
American Flow Control Corp., 2220 South Blvd., Houston, Tex.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 1300 Hampton Ave., St. Louis 10, Mo.
American Gas & Chemicals, Inc., Leak-Tec Div., 120 East End Ave., New York 28, N. Y.
American Gilsonite Co., 134 W. Broadway, Salt Lake City 1, Utah
American Hair & Felt Co., Room 322, Merchandise Mart, Chicago 54.
American Hard Rubber Co., Div. of Amerace Corp., Ace Rd., Butler, N. J.
American Hydrotherm Corp., 10-55 Jackson Ave., Long Island City 1.
American Hydrovac, Div. Pitz Foundry Inc., 290 Scholes St., Brooklyn 6, N. Y.
American Instrument Co., Inc., 8030 Georgia Ave., Silver Spring, Md.
American K. A. T. Corp., Garwood, N. J.
American Ladder & Scaffold Co., Inc., 5503 N. W. 7th Ave., Miami 38, Fla.
American Machine Products Co., 208½ S. 2nd Ave., Marshalltown, Ia.
American Machine Wks., Inc., 1320 Clark St., Racine, Wis.
American Manganese Bronze Co., Rhawn & Hegerman Sts., Philadelphia, Pa.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Div., American Brass Co., The, P. O. Box 791, Waterbury 20, Conn.
American Metal Works, Inc., P. O. Box 7027, New Orleans, La.
American Meter Co., Inc., 13500 Philmont Ave., Philadelphia 16, Pa.
American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Molding Co., 355 Fremont St., San Francisco, Calif.
American Nickeloid Co., 113 Second St., Peru, Ill.
American Photocopy Equipment Co., 1920 W. Peterson Ave., Chicago 26, Ill.
American Pipe Bending Machine Co., Inc., 17 Furnace St., Poultney, Vt.
American Pipe & Steel Corp., 2201 W. Commonwealth Ave., Alhambra, Calif.
American Pipe Tool Co., 4856 W. Kinzie St., Chicago 44, Ill.
American Platinum Wks., 231 New Jersey Railroad Ave., Newark, N. J.
American Potash & Chemical Corp., Aerosol & Refrigeration Div., 3030 W. 6th St., Los Angeles, Calif.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29.
American Radiator & Standard Sanitary Corp., 40 West 40th St., New York 18, N. Y.
American Sand-Banum Co., Inc., Meadow Brook National Bank Bldg., Freeport, N. Y.
American Sanitary Mfg. Co., 308 Latimer St., Abingdon, Ill.
American Screw Co., Willimantic, Conn.
American Sealants Co., 103 Woodbine St., Hartford 6, Conn.
American Smelting & Refining Co., Federated Metals Div., 120 Broadway, New York 5, N. Y.
American Solder & Flux Co., 19th and Willard Sts., Philadelphia 40, Pa.
American Standard, Air Conditioning Div., 40 W. 40th St., New York.
American Steel Band Co., P. O. Box 565, Pittsburgh, Pa.
American Steel & Wire Div., United States Steel, Rockefeller Bldg., Cleveland 13, O.
American Tape Co., 4058 Beaufait, Detroit 7, Mich.
American Thermal Industries, Inc., 440 Illinois, Detroit 1, Mich.
American Tube Products, Inc., 100 Pulaski St., West Warwick, R. I.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Wells Wks., 100 N. Broadway, Aurora, Ill.
American Zinc Products Div., Ball Brothers Co., Greencastle, Ind.
Ames Iron Works, Inc., Oswego, N. Y.
Amic Mfg. Corp., 21-25 44th Ave., Long Island City, N. Y.
Aminco Refrigeration Products, American Injector Co., 1000 E. McNichols, Detroit 3, Mich.
Ammco Tools, Inc., 2100 Commonwealth Ave., North Chicago, Ill.
Ammerman Co., Inc., 110 N. 2nd St., Minneapolis 1, Minn.
Amp Corp., 2921 Locust St., St. Louis, Mo.
Ampco Metal, Inc., 1745 S. 38th St., Milwaukee 46, Wis.
Ampion Corp., 4-88 47th Ave., Long Island City 1. N. Y.
Analytical Measurements, Inc., 585 Main St., Chatham, N. J.
Anchor Coupling Co., 342 N. 4th., Libertyville, Ill.
Anchor Div., Stratton & Terstegge Co., Inc., P. O. Box 311, New Albany, Ind.
Anchor Metal Co., Inc., 966 Meeker Ave., Brooklyn, N. Y.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Anders-Lykens Corp., Div. of Milton Roy Co., 1371 E. Mermaid Lane, Philadelphia 18, Pa.
Andersen Corp., Bayport, Minn.
Anderson Co., V. D., The, Div. of International Basic Economy Corp., 1949 W. 96th St., Cleveland 2, O.
Anderson Brass Co., 100 S. Campbell, Detroit 9, Mich.
Anderson Chemical Co., Inc., 1620 Waterville Rd., Macon, Ga.
Anderson Deisel Engine Co., 6245 State Rd., Philadelphia 35, Pa.
Anderson Metals Corp., Twenty-Second & Harrison Sts., Kansas City 8, Mo.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
Anderson-Stolz Corp., 1731 Walnut St., Kansas City 8, Mo.
Andrew Parts Mfg. Co., 32-70 31st St., Long Island City 6, N. Y.
Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anesite Co., 3575 Touhy Ave., Lincolnwood, Chicago 45, Ill.
Anetsberger Bros., Inc., Northbrook, Ill.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anthony Co., End of Baker, Streator, Ill.
Anti-Corrosive Metal Products Co., Inc., Castleton-On-Hudson, N. Y.
Anti-Friction Bearings Co., 6433 Foster Bridge Rd., Bell Gardens, Calif.
Applied Mechanics Co., 381 Congress St., Boston 10, Mass.
April Showers Co., Inc., 4126 Eighth St., N. W., Washington 11, D. C.
Aqua Electric Scale Control, Inc., 2026 E. 22nd St., Cleveland 15, O.
Aqua Matic, Inc., 2412 Grant, Rockford, Ill.
Aquatrol Ferr-X Corp., Clifton, N. J.
Aquatrol Laboratories, Inc., Clifton, N. J.
Arabol Mfg. Co., 110 E. 42nd St., New York 17, N. Y.
Arcee Products, Pawtucket, R. I.
Arco Co., The, 7301 Bessemer Ave., Cleveland 27, O.
Arco Mfg. Corp., 542 West 55th St., New York 19, N. Y.
Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa.
Arens Controls, Inc., 2017 Greenleaf St., Evanston, Ill.
Arex Co., 612 N. Michigan Ave., Chicago 11, Ill.
Argo Industries, Inc., 524 Wethersfield Ave., Hartford, Conn.
Argo Plastic Products, 1095 Brookpark Rd., Cleveland, O.
Arjac Products Inc., 55-59 Halstead St., Rochester 10, N. Y.
Arkla Air Conditioning Corp., Evansville 7, Ind.
Armart Mfg. Co., 103 Hawthorne Ave., Pittsfield, Mass.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Armco Steel Corp.. 703 Curtis St., Middletown, Ohio.
Armite Laboratories, 6609 Broad St., Los Angeles 1, Calif.
Armour and Co., Ammonia Div., 1355 W. 31st St., Chicago 9, Ill.
Armstrong Bros. Tool Co., 5200-5300 W. Armstrong Ave., Chicago 30.
Armstrong Co., Richard M., Box 188, West Chester, Pa.
Armstrong Cork Co., West Liberty St., Lancaster, Pa.
Armstrong Fittings Co., P. O. Box 1356, Des Moines, Ia.
Armstrong Furnace Co., Div. of National Union Electric Corp., 851 W. 3rd Ave., Columbus, O.
Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Arno Adhesive Tapes, Inc., Michigan City, Ind.
Arro Expansion Bolt Co., N. Boone Ave., Marion, O.
Arrow-Hart & Hegeman Elec. Co., 103 Hawthorne St., Hartford 6, Conn.
Arrowhead Products, Div. of Federal-Mogul-Bower Bearings, Inc., 2300 Curry St., Long Beach, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Asbestos Asphalt Insulation Co., 2100 W. Fullerton Ave., Chicago 47.
Ashburn Supply Co., 8468 Warner Dr., Culver City, Calif.
Ashcraft Co., J. P., 5643 Dyer St., Dallas 6, Tex.
Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.
Assembly Products, Inc., Chesterland 1, O.
Associated Plastic Co's., Inc., Midland, Mich.
Associated Valve & Engineering Co., 1150 W. Marquette Rd., Chicago.
Aston Products, Inc., 22804 Dequindre, Hazel Park, Mich.
Atkins Saw Div., Borg-Warner Corp., 402 S. Illinois St., Indianapolis 9, Ind.
Atkomatic Valve Co., Inc., 545 W. Abbott St., Indianapolis 25, Ind.
Atlantic Engravers, Inc., 52 Ocean Ave., Amityville, N. Y.
Atlantic Metal Hose Co., Inc., 308 Dyckman St., New York 34, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Route 17 near Moonachie Ave., P. O. Box 157, Wood-Ridge, N. J.
Atlantic Steel Boiler Co., S. E. Cor. 22nd & Washington Ave., Philadelphia 46, Pa.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlas Industries, Inc., P. O. Box 8152, Houston, Tex.
Atlas Mfg. Co., Eustis at Robbins St., St. Paul 14, Minn.
Atlas Mineral Products Co., Mertztown, Pa.
Atlas Valve Co., 282 South St., Newark, N. J.

Atlas Welding Accessories, Inc., 707 E. Lewiston Ave., Ferndale 20, Mich.
Atmos Corp., 1215 West Fullerton Ave., Chicago 14, Ill.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Burner Co., Edgerton, O.
Auburn Foundry Inc., Heating Div., Auburn, Ind.
Auburn Machine Works, Inc., Auburn, Neb.
Auburn Sparkplug Co., Inc., Auburn, N. Y.
Auer Register Co., 6600 Clement Ave., Cleveland 5, O.
Aurora Pump Div., The New York Air Brake Co., 619 Loucks St., Aurora, Ill.
Austin Engineering & Mfg. Co., Inc., 8935 San Jose Rd., Ysleta (El Paso County), Texas
Au-Temp-Co Corp., 657 Broadway, New York 12, N. Y.
Auto-Control Laboratories, Inc., 333 So. Hindry Ave., Inglewood 1, Calif.
Autoclave Engineers Sales Corp., 2930 W. 22nd St., Erie, Pa.
Automatic Burner Corp., 1823 W. Carroll Ave., Chicago 12, Ill.
Autcmatic Control Co., 995 University Ave., St. Paul 4, Minn.
Automatic Corp., 4417 Oleatha Ave., St. Louis 16, Mo.
Automatic Devices Co., Inc., 714 Hillgrove Ave., Western Springs, Ill.
Automatic Solid Fuels Equipment Co., Indianapolis, Ind.
Automatic Switch Co., Florham Park, N. J.
Automatic Temperature Control Co., Inc., 5212 Pulaski Ave., Philadelphia 44, Pa.
Automotive Rubber Co., Inc., 12550 Beech Rd., Detroit 39, Mich.
Autostributor Co., 226 Leslie St., Lansing 12, Mich.
Auto-Therm Mfg. Co., 6400 E. Seven Mile, Detroit 34, Mich.
Avon Tube Div., Higbie Mfg. Co., Ewing Rd., Rochester, Mich.
Ayres, Inc., 3401 W. 11th St., P. O. Box 672, Houston, Tex.

B

B-G Engineering Co., 5321 Long St., Houston, Tex.
Babbitt Chemical Co., 36 Prospect St., New Bedford, Mass.
Babbitt Steam Specialty Co., 1 Babbitt Sq., New Bedford, Mass.
Babcock & Wilcox Co., The, Boiler Div., 161 E. 42nd St., New York 17, N. Y.
Babcock & Wilcox Co., The, Tubular Products Div., Beaver Falls, Pa.
Bacharach Industrial Instrument Co., 200 North Braddock Ave., Pittsburgh 8.
Badger Fire Extinguisher Co., Chase St., Methuen, Mass.
Badger Mfg. Co., 230 Bent St., Cambridge 41, Mass.
Badger Sales Co., Inc., 2251 W. Pico Blvd., Los Angeles 6, Calif.
Badham Insulation Co., Inc., 1909 — 1st Ave. S., Birmingham, Ala.
Bahnson Co., 1001 S. Marshall St., Winston-Salem 1, N. C.
Bailey Co., Chas. M., 667 Folsom St., San Francisco 7, Calif.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
Bakelite Co., Div. of Union Carbide & Carbon Chemical Corp., 30 E. 42nd St., New York, N. Y.
Baker Co., Inc., The, 106 Granite St., Biddeford, Me.
Baker & Co., Inc., 113 Astor St., Newark 2, N. J.
Baker & Co., R. H., 2244 East 37 St., Los Angeles 58, Calif.
Baker Mfg. Co., Wichita Falls, Tex.
Bal-Air, Inc., 1210 McGavock St., Nashville, Tenn.
Baldor Electric Co., 4353 Duncan Ave., St. Louis 10, Mo.
Baldwin-Hill Co., 500 Breunig Ave., Trenton 2, N. J.
Baldwin Ward Mfg. Co., 1630 S. Main, Ottawa, Ks.
Balloffet Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J.
Balteau Electric Corp., New & Meadow Sts., Stamford, Conn.
Baltimore Aircoil Co., Inc., P. O. Box 7322, Baltimore 3, Md.
Banister Co., Inc., 23 Charles St., Cambridge 41, Mass.
Barber-Colman Co., 1300 Rock St., Rockford, Ill.
Barber Mfg. Co., 1058 E. 134th St., Cleveland 10, O.
Bar-Brook Mfg. Co., Inc., 6133 Linwood Ave., Shreveport, La.
Barclay, Inc., Robert, 1236 W. Fulton St., Chicago 7, Ill.
Barco Mfg. Co., 500 Hough St., Barrington, Ill.
Bard Mfg. Co., Bryan, O.
Barkow Mfg. Co., Inc., Aug. G., 2230 South 43rd St., Milwaukee 46.
Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58, Calif.
Barnebey-Cheney Co., Cassady at East 8th Ave., Columbus 19, O.
Barnes & Jones, Inc., 34 Crafts St., Newtonville, Mass.
Barnes Manufacturing Co., Mansfield, O.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barreled Sunlight Paint Co., 43 Dudley St., Providence 1, R. I.
Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett Haentjens & Co., Hazleton, Pa.
Barrows Porcelain Enamel Corp., Langdon Farm Rd. & Pa. R. R., Cincinnati, O.
Barry Blower Co., 3100 California St., N.E., Minneapolis, Minn.
Barry Controls, Inc., 765 Pleasant St., Watertown 72, Mass.
Bart Mfg. Corp., 227 Main St., Belleville 9, N. J.
Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Barton Instrument Corp., 1429 S. Eastern Ave., Los Angeles 22, Calif.
Barwick Mfg. Corp., 317 E. 18th, Wichita, Kan.
Barworth, Inc., 7 Industrial Place, Summit, N. J.
Baseline Mfg. Corp. of Fla., 3335 - 22nd Avenue So., St. Petersburg 12, Fla.
Basford Co., H. R., 235 15th St., San Francisco, Calif.
Basic Engineers, Inc., 1007 Main St., Sharpsburg 15, Pa.
Basic Inc., 845 Hanna Bldg., Cleveland 15, O.
Baso, Inc., P. O. Box 461, Milwaukee, Wis.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bate Soot Blower Div., General Blower Co., Inc., 6412 Girard Ave., Philadelphia 31, Pa.
Bath Co., Cyril, The, 32400 Aurora Rd., Solon, O.
Bausch & Lomb Optical Co., 633 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave., St. Louis 10, Mo.
Bayley Blower Co., 6600 W. Burnham St., Milwaukee 14, Wis.
Beach-Russ Co., 50 Church St., New York 7, N. Y.
Beacon-Morris Corp., 60 Brainerd Rd., Allston, Boston 34, Mass.
Beaird Co., J. B., 6200 St. Vincent Ave., Shreveport, La.
Bear Mfg. Co., Industrial Div., 2030 5th Ave., Rock Island, Ill.
Bearing Co. of America, Div. of Federal-Mogul-Bower Bearings, Inc., 501 Harrisburg Ave., Lancaster, Pa.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beaver Advance Corp., Ellwood City, Pa.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Becher Pump Co., 3067 N. Elston, Chicago 18, Ill.
Beckett & Co., Inc., Thomas, 2521 Willowbrook Rd., P. O. Box 13,245, Dallas 9, Tex.
Beckett Corp., R. W., Elyria, O.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Beckman & Whitley, Inc., 985 San Carlos Ave., San Carlos, Calif.
Belco Industrial Equipment Div., Bogue Electric Mfg. Co., 100 Pennsylvania Ave., Paterson 3, N. J.
Belco Industries, Inc., 316 South 16th St., St. Louis 3, Mo.
Bell & Gossett Co., 8200 N. Austin Ave., Morton Grove, Ill.
Bell Machine Specialties, 4813 Tremont Ave., Trevose, Pa.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Beltran Associates, Inc., 1133 East 35th St., Brooklyn 10, N. Y.
Bemco, Inc., 11631 Vanowen St., North Hollywood, Calif.
Bendix-Westinghouse Automotive Air Brake Co., 950 E. Virginia St., Evansville, Ind.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Benson Co., Inc., Alex. R., Middlesettlement Rd., New Hartford, N. Y.
Bergen Pipesupport Corp., 50 Church St., New York 7, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.
Berger Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O.
Berko Electric Mfg. Co., 212-40 Jamaica Ave., Queens Village 28, N. Y.
Berna Co., A. J., 15251 Twelve Mile Rd., Roseville, Mich.
Berna Corp., P. O. Box 66, Garwood, N. J.
Bernard-Franklin Co., Inc., 3126 E. Hedley St., Philadelphia 37, Pa.
Bernz Co., Otto, Driving Park & Ramona, Rochester 13, N. Y.
Berry-Hill Corp., Hill Diesel Engine Div., 1 Washington Ave., Providence, R. I.
Bertram Co., Harvey P., The, 2225 Bogen St., Cincinnati 22, O.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.
Besser Furnace and Air Conditioning Corp., 754 Clement Ave., Charlotte, N. C.
Best Combustion Equipment Co., Inc., W. N., 415 11th St., Carlstadt, N. J.
Bete Fog Nozzle Inc., 309 Wells St., Greenfield, Mass.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Beverly Shear Mfg. Co., 3019 W. 111th St., Chicago 43, Ill.
Bica Co., 1170 N. State St., Girard, O.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12.
Bigelow Co., The, 174 River St., New Haven 3, Conn.
Bigelow Liptak Corp., 13300 Puritan Ave., Detroit 27, Mich.
Biggs Boiler Wks. Co., The, 1007 Bank St., E. Akron 5, O.
Bignall & Keeler Div., John Ramming Machine Co., 4591 McRee Ave., St. Louis 10, Mo.
Billings & Spencer Co., 1 Laurel St., Hartford 1, Conn.
Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
Birks Mfg. Co., 811 Hanover Rd., Meriden, Conn.
Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
Bituminous Coal Institute, Southern Bldg., Washington 5, D. C.
Black & Decker Mfg. Co., The, 628 Pennsylvania Ave., Towson 4, Md.
Black Mfg. Co., The, 70 Okner Parkway, Livingston, N. J.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 26, Mo.
Black & White Chemical Co., 130 Walnut Ave., New York 54, N. Y.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 46, Wis.
Blackmer Pump Co., 1809 Century Ave., S. W., Grand Rapids 9, Mich.
Blaw Knox Co., Buflovak Equipment Div., 50 Winchester Ave., Buffalo 11, N. Y.
Blaw Knox Co., Power Piping and Sprinkler Div., 829 Beaver Ave., Pittsburgh 33, Pa.
Blazer & Son, M., 173 Market St., Passaic, N. J.
Blissfield Mfg. Co., Blissfield, Mich.
Blood Brothers Machine Div., Rockwell Spring and Axle Co., Allegan, Mich.
Blossom Mfg. Co., Inc., 292 5th Ave., New York 10, N. Y.
Blower Application Co., 3165 N. 30th St., Milwaukee 16, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W., Roselle Park, N. J.
Bluffton Electric Co., Bluffton, Ind.
Bock Corp., 110 S. Dickinson St., Madison, Wis.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Bohn Aluminum & Brass Corp., 1400 Lafayette Bldg., Detroit, Mich.
Bohn Aluminum & Brass Corp., Betz Div., Danville, Ill.
Boiler Engineering & Supply Co., Manavon St., Phoenixville, Pa.
Bolta Products, A Div. of General Tire & Rubber Co., Lawrence, Mass.
Bonney Forge & Tool Wks., Cedar & Meadow Sts., Allentown, Pa.

Borden Co., The, Chemical Div., Coatings & Adhesives Div., Lincoln Blvd., Middlesex, N. J.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borm Mfg. Co., 23 N. Union St., Elgin, Ill.
Boston Gear Works, Quincy 71, Mass.
Boston Machine Works Co., 7 Willow St., Lynn, Mass.
Boston Woven Hose & Rubber Co., Div. of American Biltrite Rubber Co., 29 Hampshire St., Cambridge, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bound Brook Oil-less Bearing Co., Bound Brook, N. J.
Bowen Engineering, Inc., North Branch, N. J.
Bowerston Shale Co., The, P.O. Box 2, Bowerston, O.
Bowman Co., D. F., 315 W. Main St., New Albany, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Brady Co., W. H., 727 W. Glendale Ave., Milwaukee 9, Wis.
Brandt & Co., Inc., Eugene J., 50-20 25th St., Long Island City 1, N. Y.
Brass & Copper Imports, Inc., 4410 W. Lake Harriet Blvd., Minneapolis, Minn.
Breeze Corporations, Inc., Union, N. J.
Breidert Co., G. C., P. O. Box 1190, San Fernando, Calif.
Bremil Mfg. Co., 1020 Holland St., Erie, Pa.
Bressler Engineering Service, Oregon, Ill.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., 155 Hill St., Milford, Conn.
Brisk Metal Products, 103 Park Ave., New York 17, N. Y.
Bristol Co., The, P. O. Box 1790, Dept. HPAC, Waterbury, Conn.
Broad Crane & Engineering Service Co., 779 S. Dumfries, Detroit 17, Mich.
Broan Mfg. Co., Inc., P. O. Box 140, Hartford, Wis.
Bronson Fan Mfg. Corp., 4560 Worth St., Los Angeles, Calif.
Bronze Bearings, Inc., 340 North Ave., Cranford, N. J.
Brook Motor Corp., 3553 W. Peterson Ave., Chicago 45, Ill.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, Inc., 240 Cushing St., Stoughton, Mass.
Brooklyn Paint & Varnish Co., Inc., 50 Jay St., Brooklyn 1, N. Y.
Brooks Equipment Corp., 217 Hudson St., Hoboken, N. J.
Brooks Rotameter Co., P. O. Box 432, Lansdale, Pa.
Brookside Corp., McCordsville, Ind.
Bros Boiler & Mfg. Co., Wm., 1057 10th Ave., S. E., Minneapolis 14.
Brown Co., 150 Causeway St., Boston 14, Mass.
Brown-Brockmeyer Co., Inc., P. O. Box 989, Dayton 1, O.
Brown-Electro Co., 17 N. Dewey, Oklahoma City 2, Okla.
Brown Products Corp., 1090 Springfield Road, Union, N.J.
Browning Mfg. Co., 1940 Browning Blvd., Maysville, Ky.
Brundage Co., The, 503 N. Park St., Kalamazoo 11, Mich.
Bruner Corp., 4763 N. 32nd St., Milwaukee, Wis.
Bruning Co., Inc., Charles, 4700 Montrose Ave., Chicago 41, Ill.
Brunner Co., The, Subsidiary of Dunham-Bush, Inc., Rt. 129, Athens Rd., Gainesville, Ga.
Brunner Div. of Dunham-Bush, Inc., 1821 Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant, Div. of Carrier Corp., 2020 Montcalm St., Indianapolis, Ind.
Bubar Dust Systems, Old Lyme, Conn.
Buckeye Furnace Pipe Co., The, 897 Ingleside, Columbus 8, O.
Buckeye Tools Corp., 5070 Springboro Pike, Dayton, O.
Buda Div., The, Allis-Chalmers Mfg. Co., Harvey, Ill.
Budlew Products Co., 3535 W. Cortland, Chicago, Ill.
Buell Engineering Co., Inc., 123 Williams St., New York 38, N. Y.
Buensod-Stacey, Inc., 45 W. 18th St., New York 11, N. Y.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
Buffalo Pumps, Div. of Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., South Ave., Dunellen, N. J.
Builders-Providence, Inc., Div. of B-I-F Industries, Inc., 381 Harris Ave., Providence 1, R. I.
Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Bunker Hill Co., The, Sales & Fabrication Div., 2700 16th Ave., S. W., Seattle 4, Wash.
Burden Co., Alan E., 1940 Pontius Ave., Los Angeles 34, Calif.
Burdett Mfg. Co., 4920 S. Monitor, Chicago 38, Ill.
Burdett Oxygen Co. of Calif., 2014 Belgrave Ave., Huntington Park, Calif.
Burgess-Manning Co., Architectural Products Div., 5970 Northwest Highway, Chicago 31, Ill.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., 1201 W. 12th St., Erie, Pa.
Burke Engineering, 1824 S. Burlington, Los Angeles 6, Calif.
Burling Instrument Co., Air Conditioning Div., 16 River Rd., Chatham, N. J.
Burlis Products Co., 1619 Bergen St., Brooklyn 13, N. Y.
Burnham Corp., Main St., Irvington, N. Y.
Burr Oak Tool & Gauge Co., P. O. Box 471, 1009 Prairie Ave., Sturgis, Mich.
Burrows Mfg. Co., F. A., P. O. Box 725, York, Pa.
Burt Mfg. Co., 931 S. High St., Akron 11, O.
Burtchaell Heating Co., 2944 S. E. Powell, Portland, Ore.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
Buxton Mfg. Co., Dover, N. J.
By-Buk Co., 4314 West Pico Blvd., Los Angeles 19, Calif.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa.
Byron Jackson Pumps, Inc., A Subsidiary of Borg-Warner Corp., P. O. Box 2017, Terminal Annex, Los Angeles 54.

C

C C Pump Mfg. Div., Market-Madison Sts., Palmyra, N. J.
CCA Products, Inc., P. O. Box 671, Glendale 5, Calif.
C & H Air Conditioning Fan Co., Inc., 1603 DeKalb Ave., N. E., Atlanta 6, Ga.
C.L.B. Co., 1917 Portsmouth, P. O. Box 6031, Houston 6, Tex.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Cain Mfg. Co., 1111 N. 5th Ave., Birmingham 4, Ala.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25.
Calculator Specialties Co., 122 S. Michigan Ave., Chicago 3, Ill.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calgon Co., Hagan Bldg., Pittsburgh 30, Pa.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
California Steel Products, Div. of Yuba Consolidated Industries, Inc., Barrett Ave. & A St., Richmond, Calif.
Caliputer, P. O. Box 586, Rancho Santa Fe, Calif.
Cambridge Filter Corp., 738 Erie E. Blvd., Syracuse 3, N. Y.
Camco Products Inc., 445 State St., North Haven, Conn.
Cameron Iron Works, Inc., P. O Box 1212, Houston, Tex.
Cam-Lok Div., Empire Products, Inc., P. O. Box 98, Cincinnati 36, O.
Camloc Fastener Corp., 22 Spring Valley Rd., Paramus, N. J.
Campbell Co., E. K., Manchester at 18th, Kansas City 26, Mo.
Campbell Co., J. A., 645 E. Wardlow Rd., Long Beach 7, Calif.
Campbell Heating Co., 3121 Dean Ave., Des Moines 17, Ia.
Campco Div., Chicago Molded Products Corp., 2733 N. Normandy Ave., Chicago, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., 11833 West Olympic Blvd., Los Angeles 64, Calif.
Can Arm Corp., P. O. Box 156, Champlain, N. Y.
Cannon Chemical Co., Inc., 181 Portland St., Cambridge 41, Mass.
Canton Stoker Corp., 2400 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 2115 Locust St., St. Louis 3, Mo.
Capewell Mfg. Co., 60 Governor St., Hartford 2, Conn.
Capitol Mfg. & Supply Co., 153 W. Fulton St., Columbus, O.
Caranth Co., 411 Eichelberger, St. Louis, Mo.
Carboline Co., The, 32 Hanley Ind. Court, St. Louis 17, Mo.
Cardox Corp., 307 N. Michigan Ave., Chicago, Ill.
Carey Electronic Engineering Co., Metal Wool Div., 1880 Clifton Ave., Springfield, O.
Carey Mfg. Company, Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 15 Park Row, New York 38, N. Y.
Carlen Associates, 40 West 57th St., New York, N. Y.
Carlin Co., The, Wethersfield, Conn.
Carling Turbine Blower Co., 8 Nebraska St., Worcester Mass.
Carlon Products Corp., 10225 Meech Ave., Cleveland 5, O.
Carlson Rules Branch, Henry Disston Div., H. K. Porter Co., Inc., 1617 California St., Monrovia, Calif.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carnes Corp., Verona, Wis.
Carney Co., Inc., The, Mankato, Minn.
Carolina Aniline & Extract Co., 301 S. Cedar St., Charlotte, N. C.
Carolina Blower Co., Inc., 428-436 Morehead Ave., Greensboro, N. C.
Carpenter Heating & Air Conditioning Co., 2135 St. Clair Ave., Cleveland 14, O.
Carpenter & Paterson, Inc., 18 Hurley St., Cambridge 41, Mass.
Carpenter Sales Corp., 4545 E. 71st St., Cleveland 5; O.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Carpenter Valve Corp., The, 6723 Denison Ave., Cleveland 2, O.
Carrier Corp., 300 S. Geddes St., Syracuse 1, N. Y.
Carter Controls, Inc., 2800 Bernice Road, Lansing, Ill.
Carvell Heat Equipment Co., 1217 Temple St., Los Angeles 26, Calif.
Carver Pump Co., 1460 Hershey Ave., Muscatine, Ia.
Cash Co., A. W., P. O. Box 551, Decatur, Ill.
Cash Valve Mfg. Corp., A. W., 6621 E. Wabash Ave., Decatur, Ill.
Cashin Co., W. D., 69 A. St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Cauhorn Distributing Co., 20722 W. Seven Mile, Detroit 19, Mich.
Cavalier Corp., Electric Heating Div., 343 West First St., Chattanooga, Tenn.
Ceilcote, Inc., 4832 Ridge Rd., Cleveland 9, O.
Ceilheat, Inc., 5212 Homberg Drive, Box 10066, Knoxville, Tenn.
Celanese Corp. of America, P. O. Box 1414, Charlotte, N. C.
Celotex Corp., The, 120 S. La Salle St., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., Murray & Pacific Sts., Newark 5, N. J.
Central Iron & Wire Works, 401 S.E. 4th St., Des Moines 16, Ia.
Central States Steel Boiler Co., 4649 W. Harrison St., Chicago 44, Ill.
Central Station Steam Co., 2920 E. Woodridge St., Detroit 7, Mich.
Central Steel & Wire Co., P. O. Box 5610-A, Chicago 80, Ill.
Central Transformer Corp., Pine Bluff, Ark.
Centrifix Corp., 3608 Payne Ave., Cleveland 14, O.
Centri-Spray Corp., 39001 Schoolcraft Rd., Livonia, Mich.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Century Engineering Corp., 401 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 41 Cedar St., Stamford, Conn.
Century Instrument Co., 220 East Milwaukee St., Detroit, Mich.
Cepi-American, Inc., 7767 North Ave., River Forest, Ill.
Certified Furnace Corp., P. O. Box 1059, Trenton 8, N. J.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 4621 W. Greenfield, Milwaukee 1, Wis.
Chamberlin Co. of America, 1254 La Brosse St., Detroit 32, Mich.
Champion Blower & Forge Co., Harrisburg Ave., and Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 215 Eaton St., Peoria 3, Ill.
Champion Pneumatic Machinery Co., 825 N. Pleasant St., Princeton, Ill.
Chaplin-Fulton Mfg. Co., 5800 Grand Ave., Pittsburgh 25, Pa.

Chapman Valve Mfg. Co., The, Indian Orchard, Springfield, Mass.
Char-Gale Mfg. Co., 4325 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 236 Grand St., Waterbury 20, Conn.
Chelsea Fan & Blower Co., Inc., 639 South Ave., Plainfield, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Chem Industrial Co., Brooklyn 9, O.
Chemical Coatings & Engineering Co., West Chester Pike, Edgemont, Pa.
Chemical Sales Div., Firestone Plastics Co., Pottstown, Pa.
Chemical Solvent Co., 3005 N. 16th St., Birmingham, Ala.
Chemiquip Co., 36 E. 10th St., New York 3, N. Y.
Chempump Corp., 1300 E. Mermaid Lane, Philadelphia 18, Pa.
Cheney Flashing Co., 623 Prospect St., Trenton 5, N. J.
Chesapeake & Ohio Railway Co., Terminal Tower, Cleveland 1, O.
Chestflex Corp., 684 Nepperhan Ave., Yonkers, N. Y.
Chester Cable Corp., Chester, N. Y.
Chesterton Co., A. W., 6 Ashland St., Everett 49, Mass.
Chicago Belting Div., Chicago-Allis Mfg. Corp., 113-125 N. Green St., Chicago 7, Ill.
Chicago Blower Corp., 9867 Pacific Ave., Franklin Park, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 1338 W. Concord Pl., Chicago 22, Ill.
Chicago Float Works, Not Inc., Dept. T., 2330 S. Western Ave., Chicago 8, Ill.
Chicago Forging and Mfg. Co., 2000 Southport Ave., Chicago 14, Ill.
Chicago Gasket Co., 1271 West North Ave., Chicago 22, Ill.
Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 650 Lake St., Oak Park, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Chicago Pump Co., Subsidiary of Food Machinery & Chemical Corp., 622 Diversey Pkwy., Chicago 14, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Furnace Company, 9326 S. Anthony Ave., Chicago 17, Ill.
Chicago Steel Tank Co., Div. of U. S. Industries, Inc. 6400 W. 66th, Chicago 38, Ill.
Chicago-Wilcox Mfg. Co., 7701 Avalon Ave., Chicago 19, Ill.
Chiksan Co., Brea, Calif.
Childers Mfg. Co., 3620 W. 11th St., Houston 8, Tex.
Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., 1600 Webster St., Dayton 1, O.
Cincinnati Electrical Tool Co., The, 300 Mt. Hope Ave., Cincinnati 8, O.
Cincinnati Metalcrafts Inc., 5000 Brotherton Rd., Cincinnati 9, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Circle-Air Industries, Inc., 244 Herkimer St., Brooklyn 16, N. Y.
Circle Clamp Corp., 39 Broadway, New York 6, N. Y.
Circle Seal Products Co., Inc., 2181 E. Foothill Blvd., Pasadena 8, Calif.
Circuit Protective Devices Dept., General Electric Co., Woodford Ave., Plainville, Conn.
Cissell Mfg. Co., W. M., 831 South First St., P. O. Box 1143, Louisville 1, Ky.
Clarage Fan Co., Porter St., Kalamazoo 16, Mich.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Bros. Co., Div. of Dresser Operations, Inc., 600 Lincoln St., Olean, N. Y.
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, O.
Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
Clark Flexible Link Shaft Co., P.O. Box 73, Newton Highlands 61, Mass.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Claronex Products, Inc., 239 Java St., Brooklyn 22, N. Y.
Clauss Cutlery Co., Fremont, O.
Cla-Val Co., 17th & Placentia, Newport Beach, Calif.
Clay Equipment Corp., Cedar Falls, Ia.
Clayton & Lambert Mfg. Co., 1701 Dixie Hwy., Louisville 10, Ky.
Clayton Mfg. Co., 401 N. Temple City Blvd., El Monte, Calif.
Clayton Mark & Co., 1900 Dempster, Evanston, Ill.
Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.
Cleveland Brass Mfg. Co., The, 4606 Hamilton Ave., Cleveland, O.
Cleveland Controls, Inc., 1111 Brookpark Rd., Cleveland 9, O.
Cleveland Crane & Eng. Co., 5866 E. 289th St., Wickliffe, O.
Cleveland Graphite Bronze Co., Div. of Clevite Corp., 17000 St. Clair Ave., Cleveland 10, O.
Cleveland Heater Co., The, 2310 Superior Ave., Cleveland 14, O.
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland 4, O.
Clifford Mfg. Co., Div. of Standard-Thompson Corp., 152 Grove St., Waltham 54, Mass.
Climax Metal Products Co., 863 E. 140 St., Cleveland 10, O.
Clime-Matic Corp., Connecticut & Richards Ave., South Norwalk, Conn.
Clinton Metallic Paint Co., Clinton, N. Y.
Clipper Mfg. Co., 65 E. 28th St., Kansas City 8, Mo.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clock & Timer Dept., General Electric Co., Homer Ave., Ashland, Mass.
Clover Industries, Inc., 528 Young St., Tonawanda, N. Y.
Clow & Sons, Inc., James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cobell Industries, P. O. Box 1157, Ft. Worth, Tex.
Cobra Metal Hose Div., 4640 W. 54th St., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Brook St., P. O. Box 176, Elmwood 10, Conn.
Cochran Foil Co., Inc., P. O. Box 1654, 1430 South 13th St., Louisville 1, Ky.
Cochrane Corp., 3131 N. 17th St., Philadelphia 32, Pa.
Coe Mfg. Co., Bank St., Painesville, O.
Coen Co., 40 Boardman Pl., San Francisco 3, Calif.
Coffin Co., Jr., J. S., 326 S. Dean St., Englewood, N. J.
Coffing Hoist Div., Duff-Norton Co., Danville, Ill.
Cole-Sewell Engineering Co., 2288 University Ave., St. Paul 4, Minn.
Coleman Co., Inc., The, 250 N. St. Francis St., Wichita 1, Kans.
Collins Machinery Corp., 5474 Alhambra Ave., Los Angeles 32, Calif.
Colonial Plastics Mfg. Co., Industrial Div., 2685 E. 79th St., Cleveland 4, O.
Color-Art Printing & Stationery Co., 201 South Kirkwood Rd., Kirkwood 22, Mo.
Colt Ventilation Co. of America, Inc., 4652 Hollywood Blvd., Los Angeles 27, Calif.
Columbia Boiler Company of Pottstown, Pottstown, Pa.
Columbia Engineering Service Co., 4025 Sebastopol Hiway, Santa Rosa, Calif.
Columbia-Geneva Steel Div., United States Steel Corp., 120 Montgomery St., San Francisco 6, Calif.
Columbian Vise & Mfg. Co., 9021 Bessmer, Cleveland, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
Combustion Control Div., Electronics Corp. of America, 1 Memorial Dr., Cambridge 42, Mass.
Combustion Engineering Inc., 200 Madison Ave., New York 16, N. Y.
Combustion Equipment Co., 1202 15th St., Moline, Ill.
Comfort Products Inc, P. O. Box 8568, 440 Hillburn Dr., Dallas 2, Tex.
Commercial Filters Corp., 2 Main St., Melrose 76, Mass.
Commercial Plastics Co., 945 George St., Chicago 14, Ill.
Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commercial Solvents Corp., 260 Madison, New York, N. Y.
Commercialaire Corp. of America, 840 E. 98th St., Brooklyn 36, N. Y.
Committee on Steel Pipe Research, American Iron and Steel Institute, 150 E. 42nd St., New York 17, N. Y.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8.
Condensation Engineering Corp., 3511 W. Potomac Ave., Chicago 31.
Condenser Service & Engineering Co., Inc., 150 Observer Highway, Hoboken, N. J.
Conditioned Air, Inc., P. O. Box 2429, Charleston, W. Va.
Cone-Drive Gears Div., Michigan Tool Co., 7171 E. McNichols, Detroit 12, Mich.
Congress Drives Div., Tann Corp., 3750 E. Outer Drive, Detroit 34.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Connor Engineering Corp., Danbury, Conn.
Conoflow Corp., Subsidiary of Walworth Co., Dept. P, 2100 Arch St., Philadelphia 3, Pa.
Consolidated Metal Products Corp., Albany, N. Y.
Consolidated Pipe Co. of America, 1066 Home Ave., Akron 10, O.
Constad Laboratories, 85-02 162nd St., Jamaica 32, N. Y.
Continental Air Filters, Inc., Box 1647, Louisville 1, Ky.
Continental Can Co., Millsplastic Pipe Div., 100 E. 42nd St., New York 17, N. Y.
Continental-Diamond Fibre Corp., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Electric Equipment Co., 205 W. 4th St., Cincinnati 2, O.
Continental Equipment Co., Div. of Fisher Governor Co., Coraopolis, Pa.
Continental Machine Co., 1952-54 Maud Ave., Chicago 14, Ill.
Continental Products Co., 1150 E. 222nd St., Euclid 17, O.
Continental Radiant Glass Heating Corp., 1 E. 35th St., New York 16.
Continental Rubber Wks., 1935 Liberty St., Erie, Pa.
Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
Continental Tapes, Cayce, S. C.
Contour Marker Corp., 1843 E. Compton Blvd., Compton 2, Calif.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Control Co. of America, Soreng Div., 9555 Soreng Ave., Schiller Park, Ill.
Convector Corp., 52 Canal St., Washington, D. C.
Convector Manufacturers Ass'n., 2159 Guardian Bldg., Detroit 26, Mich.
Cook Co., Loren, 227 Depot St., Berea, O.
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Cool-Ette, Inc., 20080 James Couzens Hwy., Detroit 35, Mich.
Cooley Co., E. C., 1186 Folsom St., San Francisco, Calif.
Cooper Alloy Corp., Bloy St. & Ramsey Ave., Hillside 5, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Cooper Hewitt Electric Co., Div. of Sperti-Faraday, Inc., 720-732 Grand St., Hoboken, N. J.
Copeland Refrigeration Corp., Sidney, O.
Copes-Vulcan Div., Blaw-Knox Co., 939 West 26th St., Erie 4, Pa.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Corbman Bros., Inc., 25th & York St., Philadelphia, Pa.
Cordo Chemical Corp., 34 Smith St., Norwalk, Conn.
Corite Products, Inc., 6553 W. George St., Chicago 34, Ill.
Corley Co., Inc., The, 220 W. 42nd St., New York 36, N. Y.
Corning Glass Works, Corning, N. Y.
Cornish-Rutland Co., Williamstown, Mass.
Corrosion Control Co., Inc., 516 Fifth Ave., New York 36, N. Y.
Corrosite Div., Reliance Paint Co., 64 So. 6th St., Brooklyn, N. Y.
Corro-Vent, Inc., 2816 Spring Grove Ave., Cincinnati 25, O.
C-O Two Fire Equipment Co., Newark, N. J.
Coughlan Co., G. N., West Orange, N. J.
Couplings Co., 2205 W. Roosevelt Rd., Chicago 8, Ill.
Cox Mfg. Co., Ridgeville, Ind.
Cramer Controls Corp, Centerbrook, Conn.
Crane Associates, Robert S., 500 Hutton Place, Columbus, O.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 6458 Oakton St., Morton Grove, Ill.
CraneVeyor Corp., 1240 S. Boyle Ave., Los Angeles 23, Calif.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crawford Fitting Co., 884 East 140th St., Cleveland 10, O.
Crescent Insulated Wire & Cable Co., Trenton 5, N. J.
Crescent Plastics, Inc., 955 Diamond Ave., Evansville, Ind.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.

Crise Controls Div., Acro Mfg. Co., The, 2040 E. Main St., Columbus, O.
Croll-Reynolds Engineering Co., Inc., 17 John St., New York 38, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa.
Crosby Valve & Gage Co., 43 Kendrick St., Wrentham, Mass.
Crotty Mfg. Corp., 133-15 35th Ave., Flushing, L. I., N. Y.
Crown Controls Co., Inc., 40-44 S. Washington St., New Bremen, O.
Crown Engineer Corp., Locust St., Keyport, N. J.
Crucible Steel Co. of America, Oliver Bldg., P. O. Box 88, Pittsburgh 30, Pa.
Cryer Trap & Valve Div., Encor Corp., 28 Joralemon St., Belleville, N. J.
Crystalheat Co., Van Nuys, Calif.
Culligan Inc., Northbrook, Ill.
Cuno Engineering Corp., 78 S. Vine St., Meriden, Conn.
Curtis Mfg. Co., Refrigeration Div., 1950 Kienlen Ave., St. Louis 20, Mo.
Custanite Corp., 1228 Utica Ave., Brooklyn 3, N. Y.
Custom Engineering Co., 406 S. Main St., Los Angeles 13, Calif.
Custom Mfg. Co., 4105 W. Fullerton Ave., Chicago 39, Ill.
Cutler-Hammer, Inc., 421 N. 12th St., Milwaukee 1, Wis.
Cybertronic Corp. of America, Third & Morton Ave., Chester, Pa.
Cyclotherm Div., National-U. S. Radiator Corp., 157 E. First St., Oswego, N. Y.

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Dahl, G. W., Tupelo St., Bristol, R. I.
Dalzen Mfg. Co., 525 South Riverside, St. Clair, Mich.
Damascus Tube Co., Greenville, Pa.
Dampney Co. of America, 50 Business St., Hyde Park, Boston, Mass.
Dana Fan & Blower Corp., 49 Central Ave., Cincinnati 2, O.
Danielson Mfg. Co., Danielson, Conn.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Das Div. of The Zeller Corp., Fort Wayne Rd., Defiance, O.
Davey Compressor Co., Kent, O.
David-Ludwig Co., 14290 Goddard, Detroit, Mich.
Davidson Co., M. T., 7 Dey St., New York 7, N. Y.
Davidson Hyduty Roof Fan Co., 213 California St., Newton, Mass.
Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., 201 Halleck St., Newark 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Davison Chemical Co., Div. of W. R. Grace & Co., 101 N. Charles St., Baltimore 3, Md.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Day & Night Mfg. Co., 700 Royal Oaks Dr., Monrovia, Calif.
Dayton Automatic Stoker Co., 30 Deeds, Dayton, O.
Dayton Electric Mfg. Co., 126 S. Oakley Blvd., Chicago 12, Ill.
Dayton Rogers Mfg. Co., 2824 13th Ave. S., Minneapolis 7, Minn.
Dayton Rubber Co., 2342 W. Riverview Ave., Dayton 1, O.
Daytronic Corp. 216 S. Main St., Dayton 2, O.
Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Deansteel Products Co., 111 Merchants St., San Antonio, Tex.
Dean Thermo-Panel Coil Div., Dean Products, Inc., 616 Franklin Ave., Brooklyn 38, N.Y.
Dearborn Chemical Co., Merchandise Mart Plaza, Chicago 54, Ill.
Dearborn Stove Co., 1700 W. Commerce St., P. O. Box 5527, Dallas 2, Tex.
Dearborn Tape & Label Co., P. O. Box 4119, N. E. Station, Dearborn, Mich.
Debevoise Co., The, 74-84 20th St., Brooklyn 32, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
Deering Air Conditioning Co., The, 1069 Celestial St., Cincinnati 2, Ohio.
Defender Instrument & Regulator Co., Boody, Ill.
Degree Corp., P. O. Box 8141, Kansas City, Mo.
De Laval Steam Turbine Co., 871 Nottingham Way, Trenton 2, N. J.
Delavan Mfg. Co., 811 Fourth Ave., West Des Moines, Ia.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta Heating Corp., Cole St. & Reading R. R., Trenton 8, N. J.
Delta Welder Corp., 8525 Livernois, Detroit 4, Mich.
Deltron, Inc., 2905 Leithgow St., Philadelphia, Pa.
Deming Co., 14 Aetna St., Salem, O.
Demo-Haines Tool Corp., P. O. Box 1485, Enid, Okla.
Demuth & Sons, Inc., Charles, 245 Elm Place, Mineola, L. I., N. Y.
Denbo Engineering and Sales Co., Inc., 3301 Martindale Ave., Indianapolis.
Dennis Chemical Co., 2701 Papin, St. Louis, Mo.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desomatic Products, Inc., 1109 W. Broad St., Falls Church, Va.
d'Este Div., Kaye & MacDonald, Inc., 11-15 Central Ave., West Orange, N. J.
De-Tec-Tronic Corp., 2512 N. Halsted St., Chicago 14, Ill.
Detroit Blower Corp., 9867 Pacific Ave., Franklin Park, Ill.
Detroit Controls Corp., 5900 Trumball Ave., Detroit 8, Mich.
Detroit Controls Div., American-Standard Corp., Great Meadow Rd., Stratford, Conn.
Detroit Deisel Engine Div., General Motors Corp., 13400 W. Outer Dr., Detroit 28, Mich.
Detroit Float & Stamping Co., 625 Monroe, Detroit, Mich.
Detroit Hoist & Machine Co., 8200 Morrow St., Detroit 11, Mich.
Detroit Stamping Co., 350 Midland Ave., Detroit 3, Mich.
Detroit Stoker Co., 1510 East 1st St., Monroe, Mich.
Deutsch Co., The, 7000 Avalon Blvd., Los Angeles 3, Calif.
Devco Engineering, Inc., P. O. Box 387, Caldwell, N. J.
Devices, Inc., A Div. of Miracle Adhesives Corp., 250 Pettit Ave., Bellmore, N. Y.
DeVilbiss Co., The, 300 Phillips Ave., Toledo 1, O.
Devine Mfg. Co., Inc., J. P., 49th and A.V.R.R., Pittsburgh 1, Pa.
De Zurik Corp., Sartell, Minn.
Diamond Calk Horseshoe Co., Duluth, Minn.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Machine Tool Co., 5111 Coffman-Pico Rd., Pico, Calif.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 415, Lancaster, O.
Diamond Products, Inc., 333 Prospect St., Elyria, O.
Diceler Div. of General Machine & Mfg. Co., Blair St. and Spring Garden Ave., Berwick, Pa.
Dicks-Armstrong-Pontius, Inc., 241 S. Post St., Detroit 17, Mich.
Dickson Co., The, 7422 Woodlawn Ave., Chicago 19, Ill.
Diehl Mfg. Co., Finderne Plant, 1106 Finderne Ave., Somerville, N. J.
Dielectric Products Co., Inc., 125 Virginia Ave., Jersey City 5, N. J.
Dietz Co., Henry G., 12-16 Astoria Blvd., Long Island City 2, N. Y.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon & Co., Inc., W. C., 14620 Keswick St., Van Nuys, Calif.
Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Dings Magnetic Separator Co., 4799 W. Electric Ave., Milwaukee 46.
Division Lead Co., 7742 W. 61st Pl., Summit, Ill.
Dixie Raydiant Electric Heat Corp., 66 Eleventh St., N. E., Atlanta 9, Ga.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City 3, N. J.
DoAll Co., The, 254 N. Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 221 Munsey Bldg., Washington 4, D. C.
Dodge Mfg Corp., 500 S. Union St., Mishawaka, Ind.
Doerr Electric Corp., 508 N. 4th St., Cedarburg, Wis.
Dole Refrigerating Co., 5910 N. Pulaski, Chicago 30, Ill.
Dole Valve Co., The, 6201 Oakton St., Morton Grove, Ill.
Dollinger Corp., 9 Centre Park, Rochester 3, N. Y.
Domestic Mfg. Corp., 2415 McAllister, Houston 24, Tex.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Donaldson Div., Marvin D. Shafer Co., Inc., 2915 Knox Ave., Los Angeles 39, Calif.
Dormeyer Industries, 3418 Milwaukee Ave., Chicago 41, Ill.
Dormont Mfg. Co., 5607 Butler St., Pittsburgh 1, Pa.
Dover Mfg. Co., Box 498, Independence, Mo.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dowell Inc., P. O. Box 536, Tulsa 1, Okla.
Downing Steel Products, 2305 Smithville Rd., Dayton 10, O.
Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Wallace Ave., Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Foot of 23rd St., Brooklyn 32, N. Y.
Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids 2, Mich.
Drage Products, Inc., 406 32nd St., Union City, N. J.
Dravo Corp., Machinery Div., Dravo Bldg., Pittsburgh 22, Pa.
Drayer-Hanson, Division of National-U. S. Radiator Corp., Box 2215, Terminal Annex, Los Angeles 54, Calif.
Dreier Brothers Inc., 7301 Woodlawn Ave., Chicago 19, Ill.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., 49 Fisher Ave., Bradford, Pa.
Drew & Co., Inc., E. F., 15 E. 26th St., New York 10, N. Y.
Drico Industrial Corp., 100 8th St., Passaic, N. J.
Driv-Way Lite Co., P. O. Box 2850, Denver, Colo.
Dryer Electric Corp., Fan Div., 164-166 Wallabout St., Brooklyn 6, N. Y.
Drying Systems Co., 1812½ W. Foster Ave., Chicago 40, Ill.
Dryomatic Corp., 806 N. Fairfax St., P. O. Box 334, Alexandria, Va.
Dual-Air Fan Co., P. O. Box 208, Hampshire, Ill.
Ducon Co., Inc., The, 147 E. 2nd St., Mineola, N. Y.
Dudgeon, Inc., Richard, 789 Bergen St., Brooklyn 38, N. Y.
Dunham-Bush, Inc., 179 South St., West Hartford 10, Conn.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Duo-Therm Div., Motor Wheel Corp., Lansing 3, Mich.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Explosives Dept., Chemical Sales, Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Finishes Div., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., "Freon" Products Div., 10th and Market Sts., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Polychemicals Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durable Rubber Products, 609 W. Lake St., Chicago, Ill.
Duraloy Co., Scottdale, Pa.
Durant Insulated Pipe Co., 325 Demeter St., E. Palo Alto, Calif.
Durant Insulated Pipe Co., Inc., Williamstown, N. J.
Dura-Vent Corp., 2525 El Camino Real, Redwood City, Calif.
Durez Plastics Div., Hooker Electrochemical Co., 1953 Walck Rd., North Tonawanda, N. Y.
Duriron Co., Inc., The, 450 N. Findlay St., Dayton 1, O.
Durkee-Atwood Co., 215 N. E. 7th St., Minneapolis, Minn.
Duro Co., The, 537 E. Monument Ave., Dayton 1, O.

Duro-Dyne Corp., 800 Third Ave., New Hyde Park, Long Island, N. Y.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago 39, Ill.
Dustender Co., 3627 Pontiac Rd., Ann Arbor, Mich.
Dust Filter Co., 134 S. La Salle St., Chicago 3, Ill.
Dust Suppression & Engineering Co., P. O. Box 67, Lake Orion, Mich.
Dustex Corp., 1758 Walden Ave., Buffalo 25, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., 623 Gibson St., Kalamazoo 6, Mich.
DuVerre, Inc., 374 Delaware Ave., Buffalo 2, N. Y.
Dwyer Mfg. Co., F. W., P. O. Box 373, Michigan City, Ind.
Dyfoam Corp., 202 E. Cherry, Newcastle, Pa.
Dynamic Air Engineering, Inc., 7412 Maie Ave., Los Angeles 1, Calif.

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Eagan Co., Inc., Walter H., 2336-38 Fairmount Ave., Philadelphia 30.
Eagle Chemical Co., Inc., 20 W. Jackson Blvd., Chicago 4, Ill.
Eagle-Picher Co., American Bldg., Cincinnati 1, O.
Eastern Industries Inc., 100 Skiff St., Hamden 14, Conn.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Chemical Products, Inc., Subsidiary, Eastman Kodak Co., 260 Madison Ave., New York 16, N. Y.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Easton Plastic Products Co., Inc., 900 Line St., Easton, Pa.
Easton R. S. Corp., 876 Pacific St., Brooklyn 38, N.Y.
Eaton Air Filter Co., 2609 E. Larned, Detroit, Mich.
Eaton Mfg. Co., Foundry Div., 700 E. Huron Ave., Vassar, Mich.
Ebco Mfg. Co., 265 N. Hamilton Rd., Columbus 13, O.
Ebert Electronics Corp., 212-26 Jamaica Ave., Queens Village 28, N. Y.
Eclipse Fuel Engineering Co., 1139 Buchanan St., Rockford, Ill.
Eco Engineering Co., 12 New York Ave., Newark 1, N. J.
Econo Products Company Inc., Div. of Viking Instruments, Inc., East Haddam, Conn.
Economy Valve Seat Co., 1436 N. Keating, Chicago 51, Ill.
Eddington Metal Specialty Co., P. O. Box K, Eddington, Pa.
Eddy Valve Co., Waterford, N. Y.
Edgewood Mfg. Co., Inc., 2214 Merced Ave., El Monte, Calif.
Edison Industries, Thomas A., Instrument Div., McGraw-Edison Co., 60 Lakeside Ave., West Orange, N. J.
Eds-Wil Burner Corp., 2656 Diversey Ave., Chicago 47, Ill.
Edward Valves, Inc., 1200 W. 145th St., East Chicago, Ind.
Edwards, L. V., 32 Irving Place, Rockville Center, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eisler Engineering Co., Inc., 750 S. 13th St., Newark 3, N. J.
Ejay Baseboard Mfg. Co., 124 Boyd St., Winsted, Conn.
Elastic Porcelain Lining Corp., 221 Norris Dr., Rochester 10, N. Y.
Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
Electrend Products Corp., 606 Water St., St. Joseph 2, Mich.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo 1, O.
Electric Boat Div., General Dynamics Corp., Groton, Conn.
Electric Controller & Mfg. Co., Div. of Square D Co., 4526 Lee Rd., Cleveland 28, O.
Electric Furnace-Man, Inc., Emmaus, Pa.
Electric Hose & Rubber Co., Wilmington, Del.
Electric Machinery Mfg. Co., 800 Central Ave., Minneapolis 13, Minn.
Electric Motors & Specialties, Inc., King & Hamsher Sts., Garrett, Ind.
Electric Products Co., 1725 Clarkstone Rd., Cleveland, O.
Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Ore.
Electriglas Corp., Bergenfield, N. J.
Electriliving Corp., 4913 College Ave., Indianapolis 5, Ind.
Electro-air Cleaner Co., Inc., Olivia & Sproul Sts., McKees Rocks, Pa.
Electro Dynamic Div. of General Dynamics Corp., Bayonne, N. J.
Electrofilm, Inc., P. O. Box 106, North Hollywood, Calif.
Electro Rust-Proofing Corp., 30 Main St., Belleville, N. J.
Electrol Burner Mfg. Co., Inc., 22 Union Ave., Rutherford, N. J.
Electromode Div. of Commercial Controls Corp., 45 Crouch St., P. O. Box 1052, Rochester 3, N. Y.
Electro-Products Mfg. Co., 8310 N. E. Highway 99, Vancouver, Wash.
Electro-Switch & Controls Inc., 5755 Camille Ave., Culver City, Calif.
Electro-Therm, Inc., 931 Selim Rd., Silver Spring, Md.
Electro Tool Corp., 2609 Sunset Blvd., Houston 5, Tex.
Electrovector, Inc., 475 Flushing Ave., Brooklyn 5, N. Y.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgen Mfg. Co., 41-34 39th St., Long Island City 4, N. Y.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 2738 W. Warren Ave., Detroit 8, Mich.
Elliott Co., Jeannette, Pa.
Ellicott Fabricators, Inc., Clare & Kolman Sts., Baltimore 30, Md.
Ellis & Watts Products, Inc., P. O. Box 33, Cincinnati 36, O.
Ellison Draft Gage Co., 548 W. Monroe St., Chicago, Ill.
Elraco Engineering Co., 732 W. 58th St., Los Angeles 37, Calif.
El-Tronics, Inc., 1420 Walnut St., Philadelphia 2, Pa.
Embassy Steel Products, Inc., 890 Stanley Ave., Brooklyn 8, N. Y.
Emco Pneumatic Corp., 1317 Locust St., Des Moines, Ia.
Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 21.
Emerson-Quiet Kool Corp., 14th & Coles St., Jersey City, N. J.
Emjay Maintenance Engineers, 327 Union Ave., Rutherford, N. J.
Empire Chemical Products Co., 10 Longworth St., Newark 2, N. J.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City, N. Y.
Enderle, Inc., Ltd., Frank X., 1715 San Fernando Rd., Los Angeles 65, Calif.
Engelhard, Inc., Charles, 850 Passaic Ave., East Newark, N. J.
Engesser & Co., William L., 9745 East Rush St., El Monte, Calif.
Engineer Co., 75 West St., New York 6, N. Y.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., 18th & Florida Sts., San Francisco 10, Calif.
Equipco, Inc., 1238 N.W. Glisan, Portland 9, Ore.
Equipment Engineering Co., 2853 Columbus Ave., Minneapolis, Minn.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erickson Specialty Co., 10 Cayuga St., P. O. Box 141, Cohoes, N. Y.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 735 W. 12th St., Erie, Pa.
Ernst Water Column & Gauge Co., Livingston, N. J.
Ero Mfg. Co., 714 W. Monroe St., Chicago 6, Ill.
Ervite Corp., 4000 W. Ridge Rd., Erie, Pa.
Ess Instrument Co., 96 S. Washington Ave., Bergenfield, N. J.
Essex Wire Corp., 1601 Wall Street, Ft. Wayne 6, Ind.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eutectic Welding Alloys Corp., 40-40 172 St., Flushing 58, N. Y.
Evanite Plastic Co., Div. of the Evans Pipe Co., Uhrichsville, O.
Evans Corp., The George, River Drive at 37th St., Moline, Ill.
Evans Machine Co., Inc., 122 S. Calverton Rd., Baltimore, Md.
Eveready Briksaw Co., 1104 Union Ave., Kansas City 1, Mo.
Everite Pump & Mfg. Corp., W. Roseville Rd., Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Everwarm, Inc., 3600 Pleasant Ridge Road, Knoxville, Tenn.
Evis Mfg. Co., 5955 N. Rockwell St., Chicago 45, Ill.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 546 W. Washington Blvd., Chicago.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
Extremultus, Inc., 405 Lexington Ave., New York 17, N. Y.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.

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F 5 Air Conditioning Corp., 1815 S. Maybelle, Tulsa, Okla.
Faber Engineering Co., Inc., Amber & Westmoreland Sts., Philadelphia 34, Pa.
Fabri-Valve Co. of America, 2100 N. Albina, Portland, Ore.
Fafnir Bearing Co., The, 37 Booth St., New Britain, Conn.
Fairbanks Co., The, 393 Lafayette St., New York 3, N. Y.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Fairmont Tool & Forging, Inc., 10611 Quincy Ave., Cleveland 6, O.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falk Corp., 3010 W. Canal St., Milwaukee 1, Wis.
Falls Industries, Inc., 31915 Aurora Rd., Solon, O.
Falstrom Co., 26 Falstrom Court, Passaic, N. J.
Famco Machine Co., 3114 Sheridan Rd., Kenosha, Wis.
Fanner Mfg. Co., The, Brookside Park, Cleveland 9, O.
Farr Company, P. O. Box 45187, Airport Station, Los Angeles 45, Calif.
Farrell Associates, Charles, Valencia, Pa.
Farris Engineering Corp., 405 Commercial Ave., Palisades Park, N. J.
Farris Flexible Valve Corp., Palisades Park, N. J.
Fasco Industries, Inc., P. O. Box 509, Rochester 2, N. Y.
Fastway Fasteners, Inc., 1676 East 28th St., Lorain, O.
Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7, N. Y.
Fedders-Quigan Corp., Heating Div., P. O. Box 1690, Trenton 7, N. J.
Federal Boiler Co., Inc., Granite and West Sts., Midland Park, N. J.
Federal-Mogul Div., Federal-Mogul-Bower Bearings, Inc., 11031 Shoemaker St., Detroit 13, Mich.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Felt Products Mfg. Co., 7450 No. McCormick Blvd., P. O. Box 8609, Chicago 80, Ill.
Felters Company, The, 210 South St., Boston 11, Mass.
Fennelly Co., J. C., 1485 Bayshore Blvd., San Francisco, Calif.
Fenwal Inc., 130 Pleasant St., Ashland, Mass.
Fenway Machine Co., 3107 N. Broad St., Philadelphia 32, Pa.
Ferguson & Lange Foundry Co., 1039 Willow St., Chicago, Ill.
Fern, Ralph, 1007 Fisk St., Scranton 9, Pa.
Ferro Corp., 4150 East 56th St., Cleveland 5, O.
Ferro Electric Products, Inc., Kirkland, Ill.
Fiber Bond Corp., 2237 S. LaSalle St., Chicago 16, Ill.
Fibercast Corp., 100 S. Lincoln, Sand Spring, Okla.
Fibreboard Paper Products Corp., 475 Brannan St., San Francisco 10.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Filt-R-Ite Co., 1408 W. Harrison St., Chicago 7, Ill.
Filtrine Mfg. Co., Inc., 63 Wanamaker Ave., Waldwick, N. J.
Fine Products Co., 6240 Ogden, Berwyn, Ill.
Finn & Company, Inc., T. R., 200 Central Ave., Hawthorne, N. J.
Finnigan & Co., Inc., J. J., 722 Marietta, N. W., Atlanta, Ga.
Fischer & Porter Co., 600 Warminster Rd., Hatboro, Pa.
Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.
Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
Flagg & Co., Inc., Stanley G., #3 Penn Center Plaza, Philadelphia 2, Pa.
Flanders Filters, Inc., Riverhead, Long Island, N. Y.
Flemm Lead Co., Inc., Bradley Ave., & School St., Long Island City, 1, N. Y.
Flexaust Co., 100 Park Ave., New York 17, N. Y.
Flexible Metal Hose Mfg. Co., 777 West 16th St., Costa Mesa, Calif.
Flexible Tubing Corp., Guilford, Conn.
Flexitallic Gasket Co., 918 N. 8th St., Camden 2, N. J.
Flexlock Corp., Box 178, Kent, O
Flexo Supply Co., Inc., 4649 Page Blvd., St. Louis 13, Mo.
Flexonics Corp., 1391 S. Third Ave., Maywood, Ill.
Flexrock Co., 36 & Filbert Sts., Philadelphia 4, Pa.
Flick-Reedy Corp., 2040 N. Hawthorne Ave., Melrose Park, Ill.

Flintkote Co., The, 30 Rockefeller Plaza, New York 20, N. Y.
Flodar Corp., 16911 St. Clair, Cleveland 10, O.
Flood Co., Hudson, O.
Flori Pipe Co., The, 5700 Bulwer, St. Louis 15, Mo.
Floridin Co., P. O. Box 989, Tallahassee, Fla.
Flow Corp., 85 Mystic St., Arlington 74, Mass.
Fluid Heat Div., Anchor Post Products, Inc., 6500 Eastern Ave., Baltimore 24, Md.
Fluid Systems, Inc., 1881 Dixwell Ave., New Haven 14, Conn.
Fluidwick Co., 5319 E. Outer Drive, Detroit 34, Mich.
Fluor Products Co., 12000 E. Washington Blvd., Whittier, Calif.
Fluor Products Co., P. O. Box 278, Garland, Tex.
Fluxolder Products Co., 438 E. Woodbridge St., Detroit 26, Mich.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Formica Corp., The, 4614 Spring Ave., Cincinnati, O.
Forney Engineering Co., 2705 Hawes St., Dallas 9, Tex.
Ft. Worth Steel & Machinery Co., P. O. Box 1038, Ft. Worth, Tex.
Forty-Eight Insulations, Inc., P. O. Box 472, Aurora, Ill.
Foster Co., Benjamin, 4636 W. Girard Ave., Philadelphia 31, Pa.
Foster Engineering Co., 835 Lehigh St., Union, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
Foster Wheeler Corp., 666 Fifth Ave., New York 19, N. Y.
Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
Fram Corp., Providence 16, R. I.
France Refractories Co., J. H., 1921 France Rd., Snow Shoe, Pa.
Franklin Balmar Corp., Woodberry, Baltimore 11, Md.
Franklin Dales Co., 180-184 E. Mill St., Akron, O.
Franklin Electric Co., Inc., 400 E. Spring St., Bluffton, Ind.
Franklin Plastics, Inc., Franklin, Pa.
Frederick Iron & Steel Inc., E. 7th St., Frederick, Md.
Freeman Heating Div., Illinois Iron & Bolt Co., Carpentersville, Ill.
Fresh'nd-Aire Co., Div. of Cory Corp., 3200 W. Peterson, Chicago, Ill.
Fretz-Moon Tube Co., Inc., P. O. Box 551, Butler, Pa.
Frick Co., Waynesboro, Pa.
Fricke, Fred J., 4404 Avenida Estrellita, Albuquerque, N. M.
Friedrich Refrigerators, Inc., 1117 E. Commerce, San Antonio, Tex.
Friermood Machine Works, Converse, Ind.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson, Baltimore 4, Md.
Frigid, Inc., 128 32nd St., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frigid Coil, Inc., 9860 Rush St., El Monte, Calif.
Frigikar Corp., 1602 Cochran, Dallas, Tex.
Frontier Bronze Corp., Packard Rd., Niagara Falls, N. Y.
Fuelguard Co., 5643 Dyer St., Dallas 6, Tex.
Fuel Reduction Corp., 220 N. Ada St., Chicago 7, Ill.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Fuller Co., 124 Bridge St., Catasauqua, Pa.
Fuller Co., D. William, 2320 E. 75th St., Chicago 49, Ill.
Fuller Co. of Calif., H. B., 57 So. Linden Ave., S. San Francisco.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Box 400, Knoxville 1, Tenn.
Furnas Electric Co., 1041 McKee St., Batavia, Ill.

G

G & H Mfg. Co., 3047 Amber St., Philadelphia 34, Pa.
G. M. Mfg. Co., 134 W. 26th St., New York, N. Y.
G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
Gabriel Boiler Co., 1428 N.W. 14th Ave., Portland, Ore.
Gallaher Co., The, 4108 Dodge St., Omaha 3, Neb.
Galloway Co., G. W., Cooling Tower Div., 220 So. First Ave., Arcadia, Calif.
Gannon Co., Inc., Russell R., The, 5535 Vine St., Cincinnati, O.
Garden City Fan Co., 801 N. Eighth St., Niles, Mich.
Garden City Instruments, Inc., 608 S. Dearborn St., Chicago 5, Ill.
Gardiner Metal Co., 4820 So. Campbell Ave., Chicago 32, Ill.
Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., The, 402 Main St., Palmyra, N. Y.
Garman Co., Inc., The, 1253 Grover Rd., St. Louis 23, Mo.
Gas Machinery Co., 16100 Waterloo Rd., Cleveland 10, O.
Gas & Oil Industry Laboratories, Inc., 4 Paine Ave., Irvington, N. J.
Gasoilair Equipment Co., P. O. Box 768, New Haven, Conn.
Gates Engineering Co., 100 S. West St., Wilmington 99, Del.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gateway Engineering Co., 3233 W. Grand Ave., Chicago, Ill.
Gatke Corp., 228 N. LaSalle St., Chicago 1, Ill.
Gato Valve Co., 912-916 Behan St., Pittsburgh 33, Pa.
Gavitt Wire & Cable Co., Div. of American Hard Rubber Co., 100 Central St., Brookfield, Mass.
Gelber & Sons, Inc., S., 5806 N. Lincoln Ave., Chicago 45, Ill.
Gel-Me Co., P. O. Box 293, Bloomington, Ill.
Gen-A-Matic Corp., 14741 Bessemer St., Van Nuys, Calif.
General Air Conditioning Corp., 4542 E. Dunham St., Los Angeles, Calif.
General Alliance Corp., 2105 Moore St., San Diego 1, Calif.
General-American Valve Co., P. O. Box 444, Corona Del Mar, Calif.
General Automatic Products Corp., 2300 Sinclair Lane, Baltimore 13, Md.
General Blower Co., 8610 Ferris Ave., Morton Grove, Ill.
General Ceramics Corp., Crows Mill Road, Keasbey, N. J.
General Chemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York, N. Y.
General Controls Co., 801 Allen Ave., Glendale 1, Calif. and Skokie, Ill.
General Electric Co., Air Conditioning Div., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Apparatus Sales Div., 1 River Rd., Schenectady 5, N. Y.
General Electric Co., Appliance Control Dept., Morrison, Ill.
General Electric Co., Appliance & Television Receiver Div., Appliance Park, Louisville 1, Ky.
General Electric Co., Capacitor Dept., Hudson Falls, N. Y.
General Electric Co., Chemical and Materials Dept., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., Commercial & Industrial Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Construction Materials Div., 1285 Boston Ave., Bridgeport 2, Conn.
General Electric Co., Laminated Products Dept., Coshocton, O.
General Electric Co., Large Lamp Dept., Nela Park, Cleveland 12, O.
General Electric Co., Wiring Device Dept., 95 Hathaway St., Providence 7, R. I.
General Filter Co., 923 Second St., Ames, Ia.
General Filters, Inc., 43800 Grand River, Novi, Mich.
General Fittings Co., P. O. Box 151, East Greenwich, R. I.
General Gas Light Co., 202 N. Park, Kalamazoo 11F, Mich.
General Heating Products Co., 7426 State Rd., Philadelphia 36, Pa.
General Metals, Inc., 858 Goldsboro St., P. O. Box 448, Greensboro, N. C.
General Paint Corp., 2627 Army St., P. O. Box 3474, San Francisco.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Register Corp., 14 Factory St., Cedar Grove, N. J.
General Scientific Equipment Co., P. O. Box 3038, Philadelphia 50, Pa.
General Tire & Rubber Co., 444 Tacoma Ave., Logansport, Ind.
General Tire & Rubber Co., 1708 Englewood, Akron, O.
General Tire & Rubber Co., Industrial Products Div., Wabash, Ind.
Geneva Mfg. Co., N. Woodbury Rd., South Elgin, Ill.
Genie-Air, 4273 S. Broadway, Los Angeles, Calif.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Germatrol Corp., 622 Brookline Blvd., Pittsburgh 26, Pa.
Gerrard & Co., A. J., 1950 Hawthorne Ave., Melrose Park, Ill.
Gerry Tool Co., The, 135 Terryville Rd., Bristol, Conn.
Giannini & Co., Inc., G. M., 918 E. Green St., Pasadena, Calif.
Giant Mfg. Co., 6th St. & 12th Ave., Council Bluffs, Ia.
Gibson-Homans Co., 2366 Woodhill Rd., Cleveland 6, O.
Gibson Refrigerator Co., Greenville, Mich.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilbert Brass Foundry Co., 5028 Farlin St., St. Louis, Mo.
Gilbreth Co., The, 1211 Chestnut St., Philadelphia 7, Pa.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 10, Wis.
Glidden Co., The, 900 Union Commerce Blvd., Cleveland 14, O.
Glidden Co., Nubian Div., 1857 N. LeClaire, Chicago 39, Ill.
Globe Phone Mfg. Co., 2 Linden St., Reading, Mass.
Globe Products, Huppower Div., Hupp Corp., 7450 Melville Ave., Detroit 17, Mich.
Glo-Brite Products, 6415 N. California Ave., Chicago 45, Ill.
Goder Incinerator Corp., 13920 S. Western Ave., Blue Island, Ill.
Goethel Sheet Metal Wks., Inc., Alfred, 3218 W. Fond du Lac Ave., Milwaukee 10, Wis.
Golden Anderson Valve Specialty Co., 1232 Ridge Ave., Pittsburgh 33.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodall Rubber Co., 441 Whitehead Rd., Trenton, N. J.
Goodfellow Co., Inc., E. D., 496 E. Bodley Ave., Memphis, Tenn.
Goodrich Chemical Co., B. F., 3135 Euclid Ave., Cleveland 15, O.
Goodrich Industrial Products Co., B. F., Akron, O.
Goodrich Industrial Products Co., B. F., Plastic Products, Marietta, O.
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O.
Goodwill Mfg. Co., 1213 S. Laramie, Chicago 50, Ill.
Gordon & Piatt, Inc., P. O. Box 914, Winfield, Kan.
Gorman-Rupp Industries, Inc., Belleville, O.
Gorton Heating Corp., Cranford, N. J.
Goss Gas Inc., 5209 Baum Blvd., Pittsburgh 24, Pa.
Gould Co., J. D., 4707 Massachusetts Ave., Indianapolis 18, Ind.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 4840 North Sewell, Oklahoma City 4, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17, N. Y.
Graham Mfg. Corp., New England Ind. Ctr., 152 Second Ave., Needham Hts. 94, Mass.
Graham Transmissions, Inc., Menomonee Falls, Wis.
Granberg Corp., 1308 67th St., Oakland 8, Calif.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Grant Wilson, Inc., 141 W. Jackson Blvd., Suite 1560, Chicago, Ill.
Graphic Calculator Co., 633 Plymouth Ct., Chicago 5, Ill.
Graphic Indicator Co., 1739 S. La Cienega Blvd., Los Angeles 35, Calif.
Graton & Knight Co., Inc., 356 Franklin St., Worcester 4, Mass.
Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.
Gray Co., Inc., 56 - 11th Ave., N. E., Minneapolis 13, Minn.
Gray Tool Co., P. O. Box 2291, Houston, Tex.
Great Northern Mfg. Corp., 1056 N. Wood St., Chicago 22, Ill.
Great Western Steel Co., 2300 West 58th, Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., Inc., The, 780 Main St., Beacon, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
Greenheck Fan & Ventilator Corp., Schofield, Wis.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockford, Ill.
Greenville Tubes, Inc., P. O. Box 30, Greenville, Pa.
Greenwood Valve Div. of Vernon Tool Co., Ltd., 1101 Meridian Ave., Alhambra, Calif.
Greer Hydraulics, Inc., N. Y. International Airport, Jamaica 30, N. Y.
Griffin & Co., 500 Bergman Ave., Louisville 8, Ky.
Griffith Equipment Co., Inc., 4503 Alger St., Los Angeles 39, Calif.
Grinnell Co., Inc., 260 W. Exchange St., Providence 1, R. I.
Griphoist, Inc., 424 Bryant St., San Francisco, Calif.
Grip Nut Co., South Whitley, Ind.

Griscom-Russell Co., The, Massillon, O.
Gross-Aire Mfg. Co., 9416 W. Milton Ave., Overland 14, Mo.
Grove Valve and Regulator Co., 65th & Hollis St., Oakland, Calif.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.
Guardian Products Corp., 1215 E. 2nd St., Michigan City, Ind.
Gulf Oil Corp., P. O. Box 1166, Gulf Bldg., Pittsburgh 30, Pa.
Gustin-Bacon Mfg. Co., 210 W. 10th St., Kansas City 6, Mo.

H

H. A. Mfg. Co., 1612 W. King St., York, Pa.
H-B Instrument Co., American & Bristol Sts., Philadelphia 40, Pa.
H & H Tube & Mfg. Co., 245-275 N. Forman Ave., Detroit 17, Mich.
H & M Pipe Beveling Machine Co., 311 East 3rd, Tulsa, Okla.
H-P Products, Inc., Louisville, O.
Hadley Products Co., Inc., Marietta, O.
Haertel Co., Walter, 2840 4th Ave., S., Minneapolis, Minn.
Hagan Chemicals & Controls, Inc., Hagan Bldg., Pittsburgh 30, Pa.
Hager Bros., East P. O. Box 1511, Rockford, Ill.
Hague & Co., Inc., Alfred, Div. of Lacquer & Chemical Corp., 214 40th St., Brooklyn 32, N. Y.
Haines & Co., Inc., Wm. S., Div. Sellers Injector Corp., 1600 Hamilton St., Philadelphia 30, Pa.
Hall Laboratories, Hagan Bldg., Pittsburgh 30, Pa.
Halstead & Mitchell, Bessemer Bldg., Pittsburgh 22, Pa.
Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamer-Drill Co., 514 Greenwich St., New York 13, N. Y.
Hamer Valves, Inc., 2919 Gardenia Ave., Long Beach 6, Calif.
Hamilton Div., Baldwin-Lima-Hamilton Corp., Hamilton, O.
Hamilton Fan & Blower Co., Inc., 2650 Colerin Ave., Cincinnati, O.
Hamilton Rubber Mfg. Corp., Meade St., Trenton 3, N. J.
Hamlin Co., Inc., J. F., 746 Ellis St., San Francisco 9, Calif.
Hammel-Dahl Co., Warwick Industrial Park, Providence 5, R. I.
Hammett Electric Mfg. Co., 209 W. 19th Terrace, Kansas City 8, Mo.
Hammond Brass Wks., 1844 Summer Blvd., Hammond, Ind.
Hampton-Cross Co., The, 120 S. 10th St., Louisville 2, Ky.
Handy Angle Div., The Lugall Co., Haverford, Pa.
Handy & Harman, 82 Fulton St., New York 38, N. Y.
Haney Gas Burner & Engineers, Inc., 909 So. Myrtle Ave., P. O. Box 147, Monrovia, Calif.
Hanna Engineering Wks., 1765 N. Elston, Chicago 22, Ill.
Hannifin Corp., 501 S. Wolf, DesPlaines, Ill.
Hanovia Chemical & Mfg. Co., 100 Chestnut St., Newark 5, N. J.
Hansen Mfg. Co., Inc., Princeton 15, Ind.
Hansen Mfg. Co., 4031 West 150th St., Cleveland, O.
Hansson, Inc., Elof, Acoustical Div., 711 3rd Ave., New York 17, N. Y.
Harco Corp., 16901 Broadway, Bedford, O.
Hardinge Oil Burner & Mfg. Co., 1770 Berteau St., Chicago 13, Ill.
Harmond Company, 2114 Woodlawn, Cleveland 2, O.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Harold Electric Co., 210 E. Alder, Walla Walla, Wash.
Harper Co., H. M., 8388 Lehigh Ave., Morton Grove, Ill.
Harrington & King Perforating Co., Inc., 5655 Fillmore St., Chicago 44, Ill.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland 2, O.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harrisburg Steel Co., Div. of Harsco Corp., 10th & Herr Sts., Harrisburg, Pa.
Harrison Radiator Div., General Motors, Lockport, N. Y.
Harrison Sheet Steel Co., 4718 W. 5th St., Chicago 44, Ill.
Harry Cooling Towers, Inc., 125 Cedar St., New York 6, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, 116 Bartholomew Ave., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn 38, N. Y.
Hartwell & Son, Inc., H. N., Park Square Bldg., Boston, Mass.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave., Piqua, O.
Harvey Aluminum, 19200 S. Western Ave., Torrance, Calif.
Hasco Valve & Machine Co., 1263 N. 70th St., Milwaukee 13, Wis.
Haskel Engineering & Supply Co., 1236 S. Central Ave., Glendale, Calif.
Haskell Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.
Hastings Air Control, Inc., 3215 Leavenworth St., Omaha, Nebr.
Hastings-Raydist, Inc., Hampton, Va.
Hauck Mfg. Co., 126-136 10th St., Brooklyn 15, N. Y.
Haveg Industries, Inc., 900 Greenbank Rd., Newark, Del.
Havens Cooling Tower, Div. of Havens Structural Steel Co., 1713 Crystal Ave., Kansas City, Mo.
Haydon Co., A. W., The, 232 N. Elm, Waterbury, Conn.
Haydon Mfg. Co., Inc., Sub. General Time Corp., Torrington, Conn.
Hayes Furnace Mfg. & Supply Co., 3233 South LaCienega Blvd., Los Angeles 16, Calif.
Hays Corp., The, 800 E. 8th St., Michigan City 14, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Healey Co., Lee, 554 W. Garfield, Glendale 4, Calif.
Healy Ruff Co., 2257 University Ave., St. Paul 14, Minn.
Heat-Exchangers, Inc., 2003 W. Fulton St., Chicago, Ill.
Heat More Tankless Heater Co., 1974 Massachusetts Ave., Cambridge, Mass.
Heatmore, Inc., 59 Throop Ave., Brooklyn 6, N. Y.
Heat & Power Corp., 424 E. Saratoga St., Baltimore 2, Md.
Heat-Timer Corp., 657 Broadway, New York 12, N. Y.
Heat Transmission Conduit Co., 2300 Payne Ave., Rm. 503, Cleveland 14, O.
Heatron, Inc., 333 Eberts Lane, York, Pa.
Heatube Corp., Allegan, Mich.
Heat-X, Inc., Brewster, N. Y.
Heating Assurance, Inc., 124 E. Augusta St., Spokane 13, Wash.
Heating Equipment Co., 19635 Schoolcraft, Detroit 23, Mich.
Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland, O.
Heinemann Electric Co., 497 Plum St., Trenton 2, N. J.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Heller Laboratories, Inc., 124 Fort Lee Rd., Leonia, N. J.
Helmco, Inc., 7400 W. Lawrence Ave., Chicago 31, Ill.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henry Furnace Co., The, Medina, O.
Henry Valve Co., 3215 North Ave., Melrose Park, Ill.
Henszey Co., 202½ N. Water St., Watertown, Wis.
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St. Louis 1, Mo.
Hercules Chemical Co., Inc., 416 Broadway, New York 13, N. Y.
Heresite & Chemical Co., Manitowoc, Wis.
Hermon Hosmer Scott, Inc., 111 Powder Mill Rd., Maynard, Mass.
HERRmidifier Co., P. O. Box 145 Neffsville, Pa.
Hersey Mfg. Co., 250 Elm St., Dedham, Mass.
Hershey Motorstokor, Inc., Manheim, Pa.
Hertner Electric Co., The, 12690 Elmwood Ave., Cleveland 11, O.
Hetherington & Berner, Inc., 747 Kentucky Ave., Indianapolis 7, Ind.
Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.
Hexdall Co., A. M., Morris, Ill.
Hi-Flow Products, Inc., 1395 Marconi Blvd., Copiague, N. Y.
Highside Chemicals, Inc., 10 Colfax Ave., Clifton, N. J.
Hi-Grade Alloy Corp., 1236 S. Talman, Chicago 8, Ill.
Hill Co., Francis, 5403 Prospect Ave., Cleveland 3, O.
Hill & Co., E. Vernon, P. O. Box 189, Lake Geneva, Wis.
Hill, Hubbell & Co., 3091 Mayfield Rd., Cleveland 18, O.
Hill, Inc., Walter P., 22183 Telegraph Rd., Detroit 19, Mich.
Hilliard Corp., 100 W. 4th St., Elmira, N. Y.
Hills-McCanna Co., 3023 N. Western Ave., Chicago 18, Ill.
Hilo Varnish Corp., Div. of Carpenter-Morton Co., 376 Third St., Everett 49, Mass.
Hilti Rapid Fastening Systems, Inc., 55 Vandam St., New York 13, N. Y.
Hinde & Dauch Paper Co., P. O. Box 861, Sandusky, O.
Hirschman-Pohle Co., Inc., 12 Lent Ave., LeRoy, N. Y.
Hite Mfg. Co., N. E., 303 North Elizabeth St., Chicago 7, Ill.
Hobart Bros. Co., Hobart Square, Troy 1, O.
Hobsite Products Co., 308 Sussex St., Harrison, N. J.
Hodge Boiler Wks., 99-111 Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., Inc., 135 Washington St., Taunton, Mass.
Hoff Mfg. Co., Johnson Rd., Bethany, New Haven 15, Conn.
Hoffman Combustion Engrg. Co., 1780 Southfield Rd., Lincoln Park, Mich.
Hoffman Specialty Mfg. Corp., 1700 W. 10th St., Indianapolis 7, Ind.
Hogart Engineering Co., 1050 S. Oliver St., Los Angeles, Calif.
Holby Tempering Valve Co., 1146 Second Ave., New York 21, N. Y.
Holden Co., A. F., 14341 Schaefer Highway, Detroit 27, Mich.
Hollands Mfg. Co., Erie, Pa.
Holsclaw Bros., Inc., 408 N. Willow Rd., Evansville 11, Ind.
Holtzer-Cabot Electric Motor Div., National Pneumatic Co., Inc., 125 Armory St., Boston 19, Mass.
Holub Industries, Inc., Sycamore, Ill.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hook Mfg. Co., Inc., McDonald (PGH), Pa.
Hoppes Mfg. Co., Inc., 301 N. Greenmount Ave., Springfield, O.
Horn Co., Inc., A. C., Subsidiary of Sun Chemical Corp., 10th St. & 44th Ave., Long Island City, N. Y.
Horton Mfg. Co., 1179 15th Ave., Minneapolis 14, Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotpoint Co., 5600 W. Taylor St., Chicago 44, Ill.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Howard Industries, Inc., Racine, Wis.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.
Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Hubbell Corp., P. O. Box 700, Hawley Rd., Mundelein, Ill.
Huck Mfg. Co., 2480 Bellvue, Detroit, Mich.
Hudson Industries, Inc., 4400 St. Aubin Ave., Detroit 7, Mich.
Hudson Mfg. Co., H. D., 589 E. Illinois St., Chicago 11, Ill.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hungerford & Terry, Inc., Clayton, N. J.
Hunt & Son, Inc., C. B., Salem, O.
Hunt Spiller Mfg. Corp., 383 Dorchester Ave., Boston, Mass.
Hunter Div., Robbins & Myers, Inc., 2500 Frisco Ave., Memphis, Tenn.
Hunter Douglas Aluminum Div., Bridgeport Brass Co., 405 Lexington Ave., New York 17, N. Y.
Hunter Mfg. Co., Aluminum Insulation Div., Bristol, Pa.
Hussey & Co., C. G., Div. of Copper Range Co., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hydrauger Corp., Ltd., 681 Market St., San Francisco 5, Calif.
Hydraulic Mfg. Co., 138 Hurd Ave., Bridgeport 4, Conn.
Hydrotherm, Inc., Clinton Ave., Northvale, N. J.
Hydrozion Engineering Co., Inc., 2003 Indiana Ave., Kansas City 27, Mo.
Hynes Electric Heating Div., Turbine Equipment Co., P. O. Box 578, Westfield, N. J.

I

I. W. Air Conditioning Corp., 230 Manida St., New York 59, N. Y.
Ideal Corp., 435 Liberty Ave., Brooklyn 7, N. Y.
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Industries, Inc., 1096 Parke Ave., Sycamore, Ill.

Key-Hak Div., Producers & Distributors, Inc., 1321 Hanover Ave.,
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.

Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
Illinois Bronze Powder Co., 2015 S. Clark St., Chicago 16, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., 2035 S. Racine Ave., Chicago 8, Ill.
Illinois Malleable Iron Co., 1701 Wellington, Chicago 13, Ill.
Illinois Oil Products, Inc., 4th Ave. and 24th St., Rock Island, Ill.
Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10.
Illinois Water Treatment Co., 840 Cedar St., Rockford, Ill.
Illinois Zinc Co., Div. of Hydrometals, Inc., 2959 W. 47th St., Chicago 32, Ill.
Imeco, Inc., 3033 W. Belmont Ave., Chicago 18, Ill.
Imperial Brass Mfg. Co., 6300 W. Howard St., Chicago 31, Ill.
Imperial Damper Co., 664 Edgecombe Ave., New York 32, N. Y.
Imperial Electric Co., 64 Ira Ave., Akron, O.
Incinerator Products, Inc., 633 S. Post Ave., Detroit, Mich.
Independent Blade Corp., P. O. Box 1482, Joliet, Ill.
Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Industrial Acoustics Co., Inc., 341 Jackson Ave., New York 54, N. Y.
Industrial Development Laboratories, Inc., 17 Pollock Ave., Jersey City 5, N. J.
Industrial Engineering Equipment Co., 122 East Fourth St., Davenport, Ia.
Industrial Engineering & Equipment Co., 24 Hanley Industrial Ct., St. Louis (Brentwood), Mo.
Industrial Filter & Pump Co., 5900 W. Ogden Ave., Chicago 50, Ill.
Industrial Laminates Div., Fabric Distributing Co., 42 White St., New York 13, N. Y.
Industrial Metal Protectives, Inc., 401 Homestead Ave., Dayton 8, O.
Industrial Plastic Fabricators, Endicott St., Norwood, Mass.
Industrial Plastics Fittings Co., 3891 W. 150th St., Cleveland, O.
Industrial Products Co., 2666 N. Fourth St., Philadelphia 33, Pa.
Industrial Screw Co., 4920 W. Madison, Chicago 44, Ill.
Industrial Service Laboratories, 710 W. National Ave., Milwaukee 4.
Industrial Sheet Metal Work, 3155 N. Halsted St., Chicago 14, Ill.
Industrial Sound Control, Dept. of Koppers Co., Inc., Metal Products Div., 200 Scott St., Baltimore 3, Md.
Industrial Tubular Equipment Co., 12906 Saticoy St., North Hollywood, Calif.
Infra Insulation, Inc., 525 Broadway, New York, N. Y.
Ingersoll Conditioned Air Div., Borg-Warner Corp., 760 E. Vine St., Kalamazoo, Mich.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Heater Corp., 3402 University S.E., Minneapolis, Minn.
Inland Steel Co., 30 W. Monroe St., Chicago 3, Ill.
Inland Steel Products Co., 4029 W. Burnham St., Milwaukee 1, Wis.
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Insto-Gas Corp., 998 E. Woodbridge St., Detroit 7, Mich.
Instrument Cases, Div. of TA Mfg. Corp., 4607 Alger St., Los Angeles 39, Calif.
Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. 4th St., Philadelphia 33, Pa.
Instruments, Inc., P. O. Box 556, Tulsa, Okla.
Insul-Fil Co., Inc., Div. of Miracle Adhesives Corp., 250 Pettit Ave., Bellmore, Long Island, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., 500 Investors Bldg., Minneapolis 2, Minn.
Insul-Mastic Corp. of America, 7750 W. 61st Place, Summit, Ill.
Integral Corp., 100 Frank Road, Hicksville, Long Island, N. Y.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis Ill.
Interchemical Corp., Finishes Div., 224 McWhorter St., Newark 1.
International Boiler Works Co., The, 5 Birch St., East Stroudsburg, Pa.
International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.
International Covers for Air Conditioners Corp., 532 Broadway, New York, N. Y.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Forge Co., 2308 S. Kedzie, Chicago, Ill.
International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Mfg. Co., 600 E. Grand Ave., Oklahoma City, Okla.
International Metal Hose Co., Ashford Ave., Bellevue, O.
International Metal Products Co., P. O. Box 1712, Phoenix, Ariz.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Powder Metallurgy Inc., Ridgway, Pa.
International Register Co., 2620 W. Washington Blvd., Chicago 12, Ill.
International Steel Co., 1545 Edgar St., Evansville, Ind.
International Vermiculite Co., Girard, Ill.
Interstate Heater Mfg. Co., 2627 West 6th Ave., Denver, Colo.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32.
Ionaire, Inc., 390 First St., San Francisco 5, Calif.
Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland 11, O.
Iron Lung Ventilator Co., 5403 Prospect Ave., Cleveland 3, O.
Irvington Div., Minnesota Mining & Mfg. Co., 6 Argyle Terrace, Irvington 11, N. J.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

J

Jabsco Pump Co., 2031 Lincoln St., Burbank, Calif.
Jack & Heintz, Inc., 17600 Broadway, Cleveland 1, O.
Jackes-Evans Mfg. Co., Controls Div., 4427 Geraldine Ave., St. Louis 15, Mo.
Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jaco Devices Co., 100 High St., Hingham, Mass.
Jaco Manufacturing Co., 9231 Clinton Ave., Cleveland 9, O.
James Mfg. Co., 104 N. Milwaukee Ave., Ft. Atkinson, Wis.
Jamesbury Corp., 48 New St., Worcester 5, Mass.
Jamieson Mfg. Co., 517 Bedford St., Dallas 12, Tex.
Jan-Air, Inc., Richmond, Ill.
Janette Elect. Mfg. Co., Lehigh at Main, Morton Grove, Ill.
Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., 400 Dublin Ave., Columbus, O.
Jarrow Products, 420 N. LaSalle, Chicago 10, Ill.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
Jefferson Union Co., 31 Fletcher Ave., Lexington 73, Mass.
Jeffrey Mfg. Co., 859 N. Fourth St., Columbus 16, O.
Jenkins Bros., 100 Park Ave., New York 17, N. Y.
Jenn-Air Products Co., 1102 Stadium Drive, Indianapolis 7, Ind.
Jennison Co., The, 87 Putnam St., Fitchburg, Mass.
Jessop Steel Co., Washington, Pa.
Jet-Lube, Inc., 3093 N. California St., Burbank, Calif.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., S. T., 940 Arlington St., Oakland, Calif.
Johnson Corp., The, 806 Wood St., Three Rivers, Mich.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Heater Corp., 1 Winnisimet St., Chelsea, Mass.
Johnson Machine Works, 619 Menomonie St., Eau Claire, Wis.
Johnson-March Corp., 1724 Chestnut St., Philadelphia 3, Pa.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnson Metal Hose, Inc., 10 Sperry St., Waterbury 20, Conn.
Johnson Plastics Corp., Box 312, Chagrin Falls, Ohio.
Johnson Service Co., 507 E. Michigan St., Milwaukee 1, Wis.
Johnson-Williams Inc., 2625 Park Blvd., Palo Alto 24, Calif.
Johnston Bros., Inc., Ferrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston & Jennings Co., 6917 Bessemer Ave., Cleveland 27, O.
Johnston Foil Mfg. Co., 6100 S. Broadway, St. Louis 11, Mo.
Johnston Pump Co., A Div. of the Youngstown Sheet & Tube Co., P. O. Bin "K", Pasadena 15, Calif.
JO-Line Tools, Inc., 8442 Otis St., South Gate, Calif.
Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.
Jones & Laughlin Steel Corp., Stainless Steel Div., Box 4606, Detroit, Mich.
Jones Machinery Div., Hewitt-Robins, Inc., 4401 Roosevelt Rd., Chicago.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 25, Ind.
Jordan Corp., Div. of OPW Corp., 6013 Wiehe Rd., Cincinnati 13, O.
Josam Manufacturing Co., Corymbo Rd., Michigan City, Ind.
Joy Mfg. Co., Dept. 20, Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Justrite Mfg. Co., 2061 N. Southport Ave., Chicago 14, Ill.

K

K-G Equipment Co., 1744 Lehigh St., Allentown, Pa.
KSM Products, Inc., Yale & Woodland Ave., Merchantville, N. J.
Kaiser Aluminum & Chemical Sales, Inc., Palmolive Bldg., 919 N. Michigan, Chicago, Ill.
Kaiser Co., E. B., 2114 W. Lake Ave., P. O. Box 47, Glenview, Ill.
Kalamazoo Div., New York Air Brake Co., Kalamazoo, Mich.
Kalamazoo Tank & Silo Co., Machine Tool Div., 500 Harrison St, Kalamazoo 16, Mich.
Kane Mfg. Corp., Kane, Pa.
Kass Hardware & Supply Co., Inc., 443 East Tremont Ave., Bronx 57, N. Y.
Kates Co., W. A., The, 430 Waukegan Rd., Deerfield, Ill.
Kaufman Co., H. J., The, 13215 Roselawn Ave., Detroit 38, Mich.
Kaustine Furnace & Tank Corp., 1492 Washington Ave., Perry, N. Y.
Kawneer Co., Niles, Mich.
Kaye & McDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Kaykor Industries, Inc., Yardville, N. J.
Kaylo Div., Owens-Illinois Glass Co., Box 1035, Toledo 1, O.
Keasbey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 3400 Cleveland St., Skokie, Ill.
Keco Industries, Inc., 2438 Beekman St., Cincinnati 14, O.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 5000 S. Halsted St., Chicago, Ill.
Keleket X-Ray Corp., 1601 Trapelo Rd., Waltham 54, Mass.
Kellogg Co., M. W., The, 711 3rd Ave., New York 17, N. Y.
Kelvinator Div., American Motors Corp., 14250 Plymouth Rd., Detroit, Mich.
Kenco Pump Div., American Crucible Products Co., 1305 Oberlin Ave., Lorain, O.
Kendall Co., Polyken Sales Div., 309 W. Jackson Blvd., Chicago 6, Ill.
Kenite Laboratory, 23 Samson Ave., P. O. Box 268, Madison, N. J.
Kenmore Machine Products, Inc., 15 Depew Ave., Lyons, N. Y.
Kennard Corp., P.O. Box 93, Clayton Post Office, St. Louis 5, Mo.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kenney Co., L. C., 2300 W. 59th St., Chicago 36, Ill.
Ken-Ray Brass Products, Inc., Vermont, Ill.
Kensico Tube Co., Mt. Kisco, N. Y.
Kent Co., Inc., 716 Canal St., Rome, N. Y.
Kent-Moore Organization, Inc., 28635 Mound Rd., Warren, Mich.
Ken-Way Corp., Sparta, Wis.
Kerotest Div., Miller Printing Machinery Corp., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
Kewanee Boiler Div., American Radiator & Standard Sanitary Corp., 101 Franklin St., Kewanee, Ill.
Kewaunee Mfg. Co., 5123 So. Center St., Adrian, Mich.

M

McGraw-Edison Co., Clark Div., 5201 W. 65th St., Chicago 28, Ill.
McGraw-Edison Co., Lonergan Coolerator Div., 704 N. Clark St.,

Key-Hak Div., Producers & Distributors, Inc., 1321 Hanover Ave., Allentown, Pa.
Keystone Carbon Co., Inc., 1935 State St., St. Marys, Pa.
Keystone Valve Corp., P. O. Box 6716, Houston 5, Tex.
Kice Metal Products Co., 485 South Washington Ave., Wichita 2, Kans.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
Kieley & Mueller, Inc., 64 Genung St., Middletown, N. Y.
Kilbury Mfg. Co., Inc., 14529 Hawthorne Blvd., Lawndale, Calif.
Kilgore, Inc., International Flare-Signal Div., Westerville, O.
Killebrew Engineering Corp., 8640 Pardee Lane, St. Louis 23, Mo.
King Co. of Owatonna, The, 928 N. Cedar St., Owatonna, Minn.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Refrigerator Co., 76-02 Woodhaven Blvd., Glendale, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
King Zeero Co., The, 4300 — 14 W. Montrose Ave., Chicago 41, Ill.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y.
Kingston-Conley, Inc., Div. of the Ohio Electric Mfg. Co., North Plainfield, N. J.
Kinney Mfg. Div., The New York Air Brake Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 3130 Forrer St., Cincinnati 9, O.
Kirsch Co., Refrigeration Div., Sturgis, Mich.
Kisco Boiler & Engineering Co., 2414 Dekalb St., St. Louis 4, Mo.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Kleer Kleen Mfg. Co., 140 Orchard Ave., Hayward, Calif.
Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
Kling Bros., Engineering Works, 1320 N. Kostner Ave., Chicago 51.
Klipfel Valves, Inc., 1075 Lincoln Ave., Hamilton, O.
Knapp Bros. Mfg. Co., 16 East 72nd St., Cincinnati 16, O.
Knapp Mills, Inc., 23-15 Borden Ave., Long Island City 1, N. Y.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knobco, Inc., 2301 Alex, Newport, Ky.
Knowles Mushroom Ventilator Co., 160 Bellevue Ave., Upper Montclair, N. J.
Kobe Inc., 3040 E. Slauson, Huntington Park, Calif.
Koch Engineering Co., Inc., 321 W. Douglas, Wichita 2, Kans.
Koch Refrigerators, Inc., 401 Funston Rd., Kansas City 15, Kans.
Kody Blower Co., 200 Bunting Ave., Trenton 5, N. J.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kool-Kar Co., Inc., 1468 Penobscot Bldg., Detroit, Mich.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa.
Koppers Co., Inc., Aeromaster Fan Dept., 6809 Scott St., Baltimore 3, Md.
Koppers Company, Inc., Metal Products Div., 200 Scott St., Baltimore 3, Md.
Korfund Co., Inc., 48-01-F 32nd Pl., Long Island City 1, N. Y.
Koven & Bro. Inc., L. O., 154 Ogden Ave., Jersey City 7, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves., Hackensack, N. J.
Kraloy Plastic Pipe Co., Inc., 4720 E. Washington Blvd., Los Angeles.
Kramer Trenton Co., N. Olden & Breunig Aves., Trenton 5, N. J.
Kresky Mfg. Co., Inc., Second & H Streets, Petaluma, Calif.
Kritzer Radiant Coils, Inc., 325 North River St., Batavia, Ill.
Krueger Air Conditioning Co., 19 E. Rillito St., Tucson, Ariz.
Krueger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
Krylon, Inc., 18 W. Airy St., Norristown, Pa.
Kuhns Bros. Co., 1800 McCall St., Dayton 8, O.
Kulka Electric Mfg. Co., Inc., 633 S. Fulton Ave., Mt. Vernon, N. Y.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kurz & Root Co., Appleton, Wis.

L

L. O. F. Glass Fibers Co., 1810 Madison Ave., Toledo 1, O.
L. R. P. Corp., Liecester, N. Y.
Laars Engineers, 13246 Saticoy St., North Hollywood, Calif.
LaBour Co., Inc., The, 1607 Sterling Ave., Elkhart, Ind.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
Laclede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
Ladish Co., 5300 S. Packard Ave., Cudahy, Wis. (Milwaukee Suburb).
Ladish Co., Tri-Clover Div., 2809 60th St., Kenosha, Wis.
LaFavorite Rubber Mfg. Co., 256 Wagaraw Rd., Hawthorne, N. J.
Laharco Industries, 721-2nd Ave., N., Minneapolis 5, Minn.
Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Lakewood Engineering & Mfg. Co., 212 N. Carpenter St., Chicago 7, Ill.
Lamb Electric Co., A Div. of American Machine & Metals, Inc., Kent, O.
Lammert & Mann Co., Wood & Walnut Sts., Chicago 12, Ill.
Lamson & Sessions Co., The, 5000 Tiedeman Rd., Cleveland 9, O.
Lancaster Heat Transfer Co., Inc., 123 DeKalb Ave., Brooklyn, N. Y.
Lancaster Pump & Mfg. Co., 1340 Manheim Pike, Lancaster, Pa.
Landis Machine Company, Fifth and Church Sts., Waynesboro, Pa.
Larkin Coils, Inc., 519 Memorial Dr., S. E., Atlanta 1, Ga.
LaSalle Products, Inc., 143 Seneca St., Buffalo 3, N. Y.
Lastik Products Co., Inc., 201 Iroquois Bldg., Pittsburgh 13, Pa.
Lattner Mfg. Co., P. M., 1411-9th St., S. W., Cedar Rapids, Iowa
Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
Lawrence Pumps Inc., 371 Market St., Lawrence, Mass.
Layne & Bowler, Inc., Box No. 6697, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5915 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leahy Mfg. Co., 1804 E. 8th St., Los Angeles, Calif.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Ledeen Mfg. Co., 3350 No. Gilman Rd., El Monte, Calif.
Lee Co., K. O., Aberdeen, S. D.
Lee Corp., P. O. Box 1801, Wilmington, Del.
Lee Vine Fin-Tube Radiator Co., Inc., 10 Fair St., New Haven, Conn.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.
Lees Div., John, The, Serrick Corp., Batavia St. and Kilgore Ave., Muncie, Ind.
Leffel & Co., James, The, 426 East St., Springfield, O.
LeHad Mfg. Corp., 1400 Seneca St., Buffalo, N. Y.
LE-HI Div., Hose Accessories Co., 2700 No. 17th St., Philadelphia 32, Pa.
Lehigh Fan & Blower Div., Fuller Co., 124 Bridge St., Catasauqua, Pa.
Lehigh Mfg. Co., Div. of Lehigh Inc., Lancaster, Pa.
Leibfried Mfg. Corp., C. H., 95 Guernsey St., Brooklyn 22, N. Y.
Leiman Bros., Inc., 163 W. Christie St., Newark, N. J.
Leland Electric Co., The, Div. of American Machine & Foundry Co., 1501 Webster St., Dayton 1, O.
Lemlar Mfg. Co., 715 W. Redondo Beach Blvd., Gardena, Calif.
Lenco, Inc., 350 W. Adams St., Jackson, Mo.
Lenk Mfg. Co., Franklin, Ky.
Lennox Industries Inc., Marshalltown, Ia.
Lennox Industries Inc., 1711 Olentangy River Rd., Columbus, O.
Lennox Industries Inc., 1701 Euclid Ave., Des Moines, Ia.
Lenz Co., 3301 Klepinger Rd., Dayton 1, O.
Leonard Precision Products Co., 9200 Bolsa Ave., Santa Ana, Calif.
Leonard Valve Co., 1360 Elmwood Ave., Cranston 7, R. I.
LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.
Leslie Co., 237 Grant Ave., Lyndhurst, N. J.
Leslie Welding Co., Inc., 2943 Carroll Ave., Chicago 12, Ill.
Levow, David, 698 Hart St., Brooklyn 21, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
Lewin-Mathes Co., Div. of Cerro de Pasco Corp., 1111 Chouteau Ave., St. Louis 2, Mo.
Lewis & Saunders, Lakeport, N. H.
Lewis Mfg. Co., Inc., 3044 S. W. 28th Lane, Miami 33, Fla.
Lewyt Air-Conditioner Corp., 5702 First Ave., Brooklyn, N. Y.
Lexsuco, Inc., 4815 Lexington Ave., Cleveland 3, O.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., 608 Madison Ave., Toledo 3, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Librascope, Inc., Commercial Div., 133 East Santa Anita Ave., Burbank, Calif.
Lidseen of North Carolina, Inc., 1000 First St., Hayesville, N. C.
Lientz Co., B. P., P. O. Box 2275, Kansas City, Mo.
Lilie-Hoffmann Cooling Towers, Inc., 1450 So. Vandeventer Ave., St. Louis 10, Mo.
Lima Electric Motor Co., Inc., The, Lima, O.
Lima Register Co., The, 1790 N. Cable Rd., Lima, O.
Lincoln Electric Co., The, 22801 St. Clair Ave., Cleveland 17, O.
Linde Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.
Lindquist Pump Corp., 10001 W. Jefferson Blvd., Culver City 12, Calif.
Lindy Heaters, Inc., 2370 Hoffman St., New York 58, N. Y.
Line Material Industries, McGraw-Edison Co., 700 W. Michigan, Milwaukee 1, Wis.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., Prudential Plaza, Dept. HPAC-S7, Chicago 1, Ill.
Lintern Corp., Route 20 East, Painesville, O.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Liquid Carbonic Div. of General Dynamics Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lithcote Corp., 5000 W. Lake St., Melrose Park, Ill.
Little Brass Goods Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Little Giant Pump Co., Div. of Little Giant Vaporizer Co., Inc., 5101 Classen Blvd., P. O. Box 9545, Oklahoma City 18, Okla.
Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, O.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 W. Roosevelt Rd., Chicago 50, Ill.
Lockport Mills, Inc., Lockport, N. Y.
Logan Clay Products, The, Box 698, Logan, O.
London Chemical Co., 1535 N. 31st Ave., Melrose Park, Ill.
Longergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Lookout Boiler & Mfg. Co., Compress St. & Mfrs. Rd., Chattanooga 1, Tenn.
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.
Lord & Clark Co., Inc., 791 Tremont St., Boston 18, Mass.
Louisville Drying Machinery Unit, General American Transportation Corp., 139 So. 4th St., Louisville 2, Ky.
Louvra Mfg. & Sales Co., 1010 Jeanette Ave., Union, N. J.
Lovejoy Flexible Coupling Co., 4987 W. Lake St., Chicago 44, Ill.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Lucey Boiler & Mfg. Corp., 1514 Chestnut St., Chattanooga, Tenn.
Ludlow Valve Mfg. Co., Inc., The, Foot of Adams St., Troy, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Lug-All Co., The, 355 Lancaster Ave., Haverford, Pa.
Lukens Steel Co. and Divisions, 308 S. First Ave., Coatesville, Pa.
Lumm Co., A. H., 3151 South Ave., Toledo 9, O.
Lunkenheimer Co., Waverly & Beckman Sts., Cincinnati 14, O.
Lurie & Lurie, 560 W. Washington, Chicago 6, Ill.
Luzerne Rubber Co., Muirhead Ave., Trenton 7, N. J.
Lynch Asbestos Co., 2939 So. Sunol Drive, Los Angeles 23, Calif.
Lynchburg Foundry Co., Courtland Bldg., Lynchburg, Va.

M

M B Mfg. Co., P. O. Box 1825, New Haven 8, Conn.
M & E Mfg. Co., 2757 Winthrop Ave., Indianapolis, Ind.
M & H Valve & Fittings Co., Div. of Walworth Co., Anniston, Ala.
M-M-A, Inc., Coho Bldg., Lancaster, Pa.
MMM, Inc., 1831 Tenth St., P. O. Box 968, Portsmouth, O.
Maas & Waldstein Co., 2121 McCarter Highway, Newark 4, N. J.
Macksons Co., 125 Cedar St., New York 6, N. Y.
Mac-Lean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Madden Brass Products Co., P. O. Box 444, Aurora, Ill.
Madden Corp., The, 1345 Jarvis Ave., Chicago, Ill.
Magic Aire Div., United Electric Co., P. O. Box 119, Wichita Falls, Tex.
MaGirl Foundry & Furnace Co., 413 E. Oakland Ave., Bloomington, Ill.
Magnatrol Valve Corp., 67 5th Ave., Hawthorne, N. J.
Magnetic Seal Corp., 301 Sowams Rd., Barrington, R. I.
Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.
Magnode Products, Inc., Box 292, Trenton, O.
Magnus Chemical Co., South Ave., Garwood, N. J.
Mahon Co., R. C., The, P. O. Box 4666, Detroit 34, Mich.
Maid-O'-Mist, Inc., 3217 N. Pulaski Rd., Chicago 41, Ill.
Mall Tool Co., Div. of Remington Arms Co., Inc., 7740 South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory & Co., Inc., P. R., 3029 E. Washington, Indianapolis 6, Ind.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Mammoth Furnace Co., 6425 Cambridge St., Minneapolis 16, Minn.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manheim Mfg. & Belting Co., 325 Stiegel St., Manheim, Pa.
Manitowoc Shipbuilding, Inc., 16th & The River, Manitowoc, Wis.
Manning Co., Charles E., 90 Clairton Blvd., Pittsburgh 36, Pa.
Manning & Lewis Engineering Co., 32 Ogden St., Newark 4, N. Y.
Manning, Maxwell & Moore, Inc., 250 East Main St., Stratford, Conn.
Mansfield & Green, 1051 Power Ave., Cleveland 14, O.
Manufacturers Corp., 104 Ausdale Ave., P. O. Box 434, Mansfield, O.
Manufacturers Engineering & Equipment Corp., Hatboro, Pa.
Maple City Furnace Co., Monmouth, Ill.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 630, Wausau, Wis.
Marble-Card Electric Corp., Gladstone, Mich.
March Mfg. Co., Inc., 8015 N. Lawndale Ave., Skokie, Ill.
Marco Co., Inc., 1000 Hess St., Saginaw, Mich.
Marco Industries, Inc., 3d & Franklin Sts., Womelsdorf, Pa.
Mar-Coil Heater Co., 200 Paterson Plant Rd., Union City, N. J.
Marion Machine Foundry, Inc., P. O. Box 989, Marion, Ind.
Markal Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Markel Electric Products, Inc., 145 Seneca St., Buffalo 3, N. Y.
Marken Plastics Corp., 2724 E. 55th St., Los Angeles, Calif.
Marley Co., The, 222 West Gregory Blvd., Kansas City 14, Mo.
Marlin-Rockwell Corp., Jamestown, N. Y.
Marlo Coil Co., 7100 S. Grand Ave., St. Louis 11, Mo.
Marlow Pumps, Division of Bell & Gossett Co., P. O. Box 200, Midland Park, N. J.
Marman Div., Aeroquip Corp., 11214 Exposition Blvd., Los Angeles 64.
Marquette Coppersmithing Co., Christian & Water Sts., Philadelphia 47, Pa.
Marquette Mfg. Co., Inc., 307 E. Hennepin Ave., Minneapolis 14, Minn.
Marsh Heating Equipment Co., 3501 Howard St., Skokie, Ill.
Marsh Instrument Co., 3501 Howard St., Skokie, Ill.
Marsh Refrigeration Equipment Co., Affiliate Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Marsh Valve Co., 4th St. & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Marsto Machine Co., 231 Willard St., West Quincy 69, Mass.
Martin Co., Inc., J. O., 637 Minna St., San Francisco 3, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
Marvel Engineering Co., 7227 N. Hamlin Ave., Chicago 45, Ill.
Marviray, Inc., 54 Clifton St., Newark 5, N. J.
Mason-Neilan, Div. of Worthington Corp., Norwood, Mass.
Master-Bilt Refrigeration Mfg. Co., 4209 Folsom Ave., St. Louis 10, Mo.
Master Control Co., The, 2034 Fifth St., Cuyahoga Falls, O.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Master Fan Corp., 1323 Channing St., Los Angeles 21, Calif.
Master Mechanics Co., The, 2097 Columbus Rd., Cleveland, O.
Master Products Co., 7000 S. Wentworth, Chicago 21, Ill.
Master Vibrator Co., 361 Stanley Ave., Dayton, Ohio.
Mathes Co., The, 1227 Broadway, Ft. Worth, Tex.
Matrix Engineering Corp., 3016 E. Lake St., Minneapolis 6, Minn.
Matthews Electric Heater Mfg. Co., Albertville, Ala.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 21800 Miles Ave., Cleveland 22, O.
Maurey Mfg. Corp., 2911 S. Wabash Ave., Chicago 16, Ill.
Maxitrol Co., 12200 Beech Rd., Detroit 39, Mich.
Maxon Premix Burner Co., P. O. Box 71, Muncie, Ind.
May Company, Galesburg, Ill.
Mayer Refrigerating Engineers, Inc., Lincoln Park, N. J.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., 4332 Horatio St., Detroit 10, Mich.
McAlear Mfg. Co., 1921 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 104 First Ave., Pittsburgh 22, Pa.
McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
McDonald Mfg. Co., A. Y., 12th & Pine Sts., Dubuque, Iowa.
McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill.
McGraw-Edison Co., Clark Div., 5201 W. 65th St., Chicago 28, Ill.
McGraw-Edison Co., Lonergan Coolerator Div., 704 N. Clark St., Albion, Mich.
McIntire Co., The, Okner Parkway, P. O. Box 5, Livingston, N. J.
McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.
McLarty Systems, 2600 Dickman Rd., Battle Creek, Mich.
McMillan Comfortaire, Inc., P. O. Box 5064, 1501 Miami Rd., Jacksonville 7, Fla.
McMillan Industrial Supplies, C. C., 3912 S. W. Dolph Court, Portland 19, Oregon.
McNeill Smoke Eliminator Co., 523 N. Halsted, Chicago, Ill.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore.
McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10.
McRae Specialty Co., Don, 750 N. Glendale Ave., Glendale 6, Calif.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mearlcrete Div., Mearl Mfg. Corp., 220 Westfield Ave., W., Roselle Park, N. J.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., P. O. Box 223, Bridgeport, Pa.
Mechanical Industries Production Co., 217-223 Ash St., Akron 8, O.
Mechanical Products Corp., 168 N. Ogden Ave., Chicago 7, Ill.
Meier Electric & Machine Co., Inc., 3525 E. Washington St., Indianapolis 7, Ind.
Mel Products Co., The, 554 Chapel St., New Haven, Conn.
Melchior, Armstrong. Dessau Co. of Delaware, Inc., Ridgefield, N. J.
Memco Crane Co., 1007 N. W. 36th St., Oklahoma City 18, Okla.
Memphis Pump & Mfg. Co., P. O. Box 3215, Memphis, Tenn.
Menardi & Co., 1222 E. Grand Ave., El Segundo, Calif.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
Mercoid Corp., The. 4201 Belmont Ave., Chicago 41, Ill.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton 6, O.
Mercury Hydraulics, Inc., 2440 Blake St., Denver 5, Colo.
Meriam Instrument Co., The, 10929 Madison Ave., Cleveland 2, O.
Mesker Steel Corp., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metalcraft Inc., Mason City, Ia.
Metal Fabricators, Inc., P. O. Box 3232, Charlotte 3, N. C.
Metal Products Eng., Inc., 4000 Long Beach Ave., Los Angeles 58, Calif.
Metal & Thermit Corp., Rahway, N. J.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.
Metallurgical Products Dept. of General Electric Co., 11177 E. 8 Mile Rd., Detroit, Mich.
Metalmaster Corp., 66 Elm St., Newark 5, N. J.
Metalweld, Inc., Protective Coatings Div., Scotts Lane & Abbotsford Ave., Philadelphia 29, Pa.
Met-L-Chek Co., 11919 S. Western Ave., Los Angeles 47, Calif.
Met-L-Wood Corp., 6755 W. 65th St., Chicago, Ill.
Metrex Valve Co., 9901 Franklin Ave., Franklin Park, Ill.
Metropolitan Refining Co., Inc., 50-23 Twenty-Third St., Long Island City 1, N. Y.
Mettler Co., Inc., The, Div. of Eclipse Fuel Engineering Co., 4366 Worth St., Los Angeles 63, Calif.
Meyer & Bro. Co., F., 308 S. Commercial St., Peoria 2, Ill.
Meyer Furnace Co., The, P.O. Box 989, Peoria 1, Ill.
Meyer & Wenthe, Inc., 30 S. Jefferson St., Chicago, Ill.
Michael Electric Co., Inc., 15 Stiles St., New Haven, Conn.
Michigan Pipe Co., Gagetown, Mich.
Mic-Lin Co., Route 38 at Rudderow Ave., Maple Shade 6, N. J.
Micro Metallic Corp., 30 Sea Cliff Ave., Glen Cove, N. Y.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Micro Switch Div. of Minneapolis-Honeywell Regulator Co., Chicago & Spring Sts., Freeport, Ill.
Microtron Corp., P. O. Box 2092, Charlotte, N. C.
Midco Register Corp., 1059 Grand Ave., St. Paul, Minn.
Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14.
Midland Paint & Varnish Co., 3802 E. 91st St., Cleveland 5, O.
Midland-Ross Corp., 444 Madison Ave., New York 22, N. Y.
Mid-States Welder Mfg. Co., 6025 S. Ashland Ave., Chicago 36, Ill.
Midwest Air Conditioning Co., 510 Third St., Des Moines, Ia.
Midwest Automatic Control Co., 510 Third St., Des Moines, Ia.
Midwest Piping Co., Inc., 1450 S. Second St., St. Louis 4, Mo.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller-Harris Instrument Co., 601 E. Ogden Ave., Milwaukee 2, Wis.
Miller Mfg. Co., 251 W. Kellog Blvd., St. Paul 2, Minn.
Miller Valve Co., Inc. P. O. Box 1255, Pittsburgh 30, Pa.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mill-Rose Co., 1985 E. 59th St., Cleveland, O.
Milton Equipment Co., N. E. Cor. 4th Race St., Philadelphia 6, Pa.
Milton Roy Co., 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Milwaukee Electric Tool Corp., 5362 W. State St., Milwaukee 8, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee 7.
Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.
Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
Minneapolis-Honeywell Regulator Co., 2753 4th Ave., S., Minneapolis 8, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.
Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., 411 Piquette, Detroit, Mich.
Minnesota & Ontario Paper Co., Investors Bldg., Minneapolis, Minn.
Minnesota Rubber & Gasket Co., 3630 Wooddale Ave., Minneapolis.
Minn-Kota Foundry & Mfg. Co., P. O. Box 576, Moorhead, Minn.
Miracle Adhesives Corp., 250 Pettit Ave., Bellmore, N. Y.
Mir-O-Col Alloy Co., Inc., 340 North Ave., 21, Los Angeles 31, Calif.
Mirror Patented Stove Pipe Co., 55-65 Park St., Hartford 14, Conn.
Misener Mfg. Co., Inc., 202-8 Walton St., Syracuse 2, N. Y.

Mission Appliance Corp., 12611 Crenshaw Blvd., Hawthorne, Calif.
Mississippi Glass Co., St. Louis 7, Mo.
Mitchell Co., John E., 3800 Commerce St., Dallas, Tex.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia 46, Pa.
Mitchell Mfg. Co., 3200 W. Peterson Ave., Chicago, Ill.
Mitchell Radiation Products Corp., 128 E. Washington St., Norristown, Pa.
Modern Div., George Getz Corp., 2316 23rd Ave., Rockford, Ill.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
Modern Hanger Corp., The, 4734 Hough Ave., Cleveland 3, O.
Modernheat Cable Corp., Box 576, Kingsport, Tenn.
Modine Mfg. Co., 1509 De Koven Ave., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Molco Drilling Machines, Inc., 1100 20th St., N. W., Washington 6, D. C.
Molded Fiber Glass Sheet Co., 4304 Benefit Ave., Ashtabula, O.
Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34, Pa.
Monash-Younker Co., Inc., 532 So. Throop St., Chicago 7, Ill.
Monitor Controller, 99 Grove St., Rockland, Mass.
Monogram Products Co., Inc., 731 N. 35th St., Philadelphia 4, Pa.
Monsanto Chemical Co., 800 N. 12th Blvd., St. Louis 1, Mo.
Montag Inc., 2011 N. Columbia Blvd., Portland 17, Ore.
Montgomery Bros., 1122 Howard St., San Francisco, Calif.
Montgomery Chemical Co., Jenkintown, Pa.
Moore Inc., Goodloe E., 2811 N. Vermilion, Danville, Ill.
Moore Co., The, 800 S. Missouri, Marceline, Mo.
Moore & Co., Samuel, Mantua, O.
Moore Dry Kiln Co., 1220 W. State St., Jacksonville, Fla.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Moran Flexible Joint Co., Div. of Railroad Products Co., 1551 Queen City Ave., Cincinnati 14, O.
Morehead Moisture Control, P. O. Box 3854, Parkgrove Sta., Detroit 5, Mich.
Moreheat Distribution Inc., 5608 Stewart Rd., Cincinnati 27, O.
Morey, Dan, 814 S. Robertson Blvd., Los Angeles 15, Calif.
Mor-Flo Heater Corp., 2176 E. 76th St., Cleveland 3, O.
Morganite, Inc., Carbon Specialties Div., 3304 48th Ave., Long Island City 1, N. Y.
Morrill Motors, 3685 Northrop, Ft. Wayne, Ind.
Morris Coupling & Clamp Co., P. O. Box 10, Kittanning, Pa.
Morris Sheet Metal Works, 635 W. Mound St., Columbus 23, O.
Morrison Brothers Co., 24th & Elm Sts., Dubuque, Ia.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Boulger Destructor Co., 80 Fifth Ave., New York 17, N. Y.
Morse Chain Co., Ithaca, N. Y.
Morse-Smith-Morse Co., The, 165 Dexter Ave., Watertown 72, Mass.
Mortell Co., J. W., Kankakee, Ill.
Morton Engineering Service, Paul S., 5131 Meadowlark Lane, P. O. Box 146, Kalamazoo, Mich.
Mt. Hawley Mfg. Co., Inc., Mt. Hawley Air Port, Peoria 4, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Muckle Mfg. Co., Owatonna 3, Minn.
Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.
Mueller Climatrol, Div. of Worthington Corp., 2005 W. Oklahoma Ave., Milwaukee 1, Wis.
Mueller Co., 512 W. Cerro Gordo St., Decatur, Ill.
Muellermist Irrigation Co., 2612 S. 9th Ave., Maywood, Ill.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Mult-A-Frame Div., Ainsworth Mfg. Corp., 1471 E. Atwater St., Detroit 7, Mich.
Multiple Corp., 1905 N. Main St., Dayton 5, O.
Multiplex Mfg. Co., Berwick, Pa.
Multi-Vent Div., Pyle-National Co., The, 1373 Kostner Ave., Chicago 51, Ill.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
Mundet Cork Corp., 7101 Tonnelle Ave., North Bergen, N. J.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., Castle Island Terminal, South Boston, Mass.
Munray Products, Inc., 12400 Crossburn St., Cleveland, O.
Murray Co. of Texas, The, P. O. Box 1517, Atlanta, Ga.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Mutual Liquid Gas & Equipment Co., 17129 S. Broadway, Box 392, Gardena, Calif.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 209 First Ave., Pittsburgh 22, Pa.
Mystik Adhesive Products, Inc., 2635 N. Kildare Ave., Chicago 39, Ill.

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Narda Ultrasonics Corp., 160 Herrick Road, Mineola, Long Island, N. Y.
Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., Clarkston, Mich.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Airoil Burner Co., Inc., 1330 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6277 W. 66th Pl., Chicago 38, Ill.
National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
National Carbon Co., A Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.
National Clay Pipe Mfg., Inc., 1820 N. St., N.W., Washington, D. C.
National Cork Co., 1 Engle Street, Englewood, N. J.
National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.
National Dust Collector Corp., 549 W. Washington, Chicago 6, Ill.
National Engineering & Mfg. Co., 16th & Lamine St., Sedalia, Mo.
National Gas Equipment Co., Inc., P. O. Box 122, Denison, Tex.
National Gypsum Co., 325 Delaware Ave., Buffalo, N. Y.
National Heater Co., Inc., 2475 Doswell Ave., St. Paul 8, Minn.
National Instrument Laboratories, Inc., 6108 Rhode Island Ave., Riverdale, Md.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Lock Co., Inc., 1902 Seventh St., Rockford, Ill.
National Oil Burner Co. of N. Y., Inc., 614 Bergen St., Brooklyn, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
National Pipe Coatings, Inc., 3480 East Randolph St., Huntington Park, Calif.
National Pneumatic Co., Inc., 420 Lexington Ave., New York, N. Y.
National-U. S. Radiator Corp., 944 Ash St., Johnstown, Pa.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Super Service Co., The, 1944 N. 13th St., Toledo 2, O.
National Time & Signal Corp., 21800 Wyoming Ave., Detroit 37, Mich.
National Tube Div., United States Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
Naugatuck Chemical Div., United States Rubber Co., Naugatuck, Conn.
Naylor Pipe Co., 1269 E. 92nd St., Chicago 19, Ill.
Nazar Rubber Co., 2727 Avondale, Toledo 7, O.
Nebel Mfg. Co., P. O. Box 3942, Shaker Square Sta., Cleveland 20, O.
Nebraska Boiler Company, Inc., 235 N. 9th St., Lincoln, Nebr.
Neff-Perkins Co., 2130 St. Clair, Cleveland, O.
Neilsen Chemical Co., 2300 Gainsboro, Detroit 20 (Ferndale), Mich.
Nelson Electric Mfg. Co., 4041 S. Sheridan Rd., Tulsa, Okla.
Nelson Foundry Co., 6116 Oakton. Morton Grove, Ill.
Nelson Mfg. Co., B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.
Neptune Meter Co., 19 W. 50th St., New York 20, N. Y.
Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa.
New Departure Div., General Motors Corp., Bristol, Conn.
New England Carbide Tool Co., Inc., 55 Commercial St., Medford 55, Mass.
New England Valve Co., 47 Lagrange Pl., Worcester, Mass.
New Haven Copper Co., The, Seymour, Conn.
New York Air Valve Corp., 1850 Atlantic Ave., Brooklyn 33, N. Y.
New York Belting & Packing Co., 1 Market St., Passaic, N. J.
New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York 13, N. Y.
Newage Industries, Inc., 222 York Road, Jenkintown, Pa.
Newark Controls Co., 15 Ward St., Bloomfield, N. J.
Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Newman Electric Motors Inc., 357 Wilson Ave., Newark 5, N. J.
Niagara Blower Co., 405 Lexington Ave., Room 3516, New York 17.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Niagara Products Co., 4311 E. Thomas Rd., Phoenix, Ariz.
Nibco, Inc., Elkhart, Ind.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40.
Nichols Instruments Co., 1115 N. Hunter St., Baltimore 2, Md.
Nicholson & Co., W. H., 178 Oregon St., Wilkes-Barre, Pa.
Nicolet Industries, Inc., Box 777, Hamilton, O.
Nielsen, Inc., E. V., 575 Hope St., P. O. Box 353, Glenbrook Sta., Stamford, Conn.
Nikoh Tube Co., 5000 S. Whipple, Chicago 32, Ill.
Niphos Process Sales Corp., 47 West St., New York, N. Y.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 20, Conn.
Nooter Corp., 1400 S. Second St., St. Louis 4, Mo.
Norden-Ketay Corp., Instrument Systems Div., Wiley St., Milford, Conn.
Norgren Co., C. A., 3400 So. Elati St., Englewood, Colo.
Norky Mfg. Corp., P. O. Box 669, 714 Pike St., Covington, Ky.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Products Co., Inc., 1150 Chesapeake Ave., Columbus, O.
Norristown Asbestos Div., Nicolet Industries, Inc., Washington St., Norristown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
North American Asbestos Corp., 141 W. Jackson Blvd., Chicago 3, Ill.
North American Mfg. Co., 4455 E. 71st St., Cleveland 5, O.
North American Mogul Products Co., The, Standard Bldg., Cleveland 13, O.
North American Philips Co., Inc., 750 S. Fulton Ave., Mt Vernon, N. Y.
North Shore Nameplate, Inc., 214-27 Northern Blvd., Bayside, N. Y.
Northern Blower Co., 6428 Barberton Ave., Cleveland 2, O.
Northern Ordnance Inc., Subsidiary of Northern Pump Co., Columbia Heights P. O., Minneapolis 22, Minn.
Norton Co., 1 New Bond, Worcester 6, Mass.
Norwalk Air Conditioning Corp., 138 Water St., S. Norwalk, Conn.
Norwalk Valve Co., South Norwalk, Conn.
Norwood Associated Engineers Inc., 904 Columbus Ave., Springfield, Mass.
Norwood Controls, A Unit of Detroit Controls, 934 Washington St., Norwood, Mass.
Norwood Products Co., Div. of A. R. Wood Mfg. Co., Luverne, Mich.
Novo Pump & Engine Co., 702 Porter, Lansing, Mich.
Nupla Mfg. Co., 1026 N. Sycamore, Los Angeles 38, Calif.
Nutmeg Chemical Co., 134 Haven St., New Haven, Conn.
NuTone, Inc., Madison & Red Banks Rds., Cincinnati 27, O.
Nu-way Corp., The, 2416 4th Ave., Rock Island, Ill.
Nye Tool Co., 4120-30 Fullerton Ave., Chicago 39, Ill.
Nylok Corp., The, 611 Industrial Ave., Paramus, N. J.

O

OPW Corp., 2735 Colerain Ave., Cincinnati 25, O.
Oakite Products, Inc., 19 Rector St., New York 6, N. Y.
Obear & Son, W. F., 940 W. Florence Ave., P. O. Box 406, Inglewood 1, Calif.
Oberdorfer Foundries, Inc., 3007 Thompson Rd., Syracuse, N. Y.
O'Brien Steam Specialty Co., Inc., P. O. Box 217, Eastwood Station, Syracuse 6, N. Y.
Octagon Process, Inc., 58 Bank St., Staten Island 1, New York.
Octagon Ventilator Co., 5828-30 S. Oakley Ave., Chicago 36, Ill.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Electric Mfg. Co., The, 5400 Dunham Rd., Maple Heights, O.
Ohio Foundry & Mfg. Co., Penn R. R. & Slack St., Steubenville, O.
Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pipe Bending & Machine Co., 3900 Trent Ave., Cleveland 9, O.
Ohmlac Paint & Refining Co., Inc., 41-40 Crescent Ave., Long Island City, N. Y.
Oil Equipment Mfg. Corp., 169 Derby Ave., New Haven, Conn.
Okadee Co., 332 S. Michigan, Chicago, Ill.
Olin Mathieson Chemical Corp., Industrial Chemicals Div., Mathieson Bldg., Baltimore 3, Md.
Olin Mathieson Chemical Corp., Western Brass Mills Div., East Alton, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
Olsen Testing Machine Co., Tinius Easton Rd., Willow Grove, Pa.
Omark Industries, 5001 S. E. Johnson Creek Blvd., Portland 6, Ore.
Omega Machine Co., Div. of B-I-F Industries, Inc., 381 Harris Ave., Providence 1, R. I.
Omega Products, 4700 W. Washington Blvd., Chicago 44, Ill.
Onan & Sons Inc., D. W., 2515 University S. E., Minneapolis 14, Minn.
O'Neil-Irwin Mfg. Co., 541 Eighth, Lake City, Minn.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis 13, Mo.
Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Oshkosh Filter & Softener Co., 51 Ceape St., Oshkosh, Wis.
Oster Mfg. Co., Box 4326, Cleveland 32, O.
Oster Mfg. Co., John, 5055 N. Lydell Ave., Milwaukee 17, Wis.
OverHead Heaters Inc., 1612 Book Bldg., Detroit 26, Mich.
Owens Co., H., 9300 Venice Blvd., Culver City, Calif.
Owens & Co., Inc., Henry, 51 Washington Ave., Cranston 7, R. I.
Owens-Corning Fiberglas Corp., National Bank Bldg., Toledo 1, O.
Oxy Catalyst, Inc., Wayne, Pa.
Oxygen Equipment & Service Co., 8335 S. Halsted St., Chicago 20.
Ozalid Div. of General Aniline & Film Corp., 1505 Ansco Rd., Johnson City, N. Y.

P

P-K Industries, Inc., 27 Porete Ave., North Arlington, N. J.
Pace Inc., R.M., 4510 Bonnie Brae, Indianapolis, Ind.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Pumping Co., 9201 San Leandro Blvd., Oakland, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco.
Pacific Steel Boiler Div., National-U. S. Radiator Corp., 944 Ash St., Johnstown, Pa.
Pacific Transducer Corp., 11836 W. Pico Blvd., Los Angeles 64, Calif.
Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.
Packard Electric Div., General Motors Corp., Warren, O.
Packard Water Conditioners, Inc., P. O. Box 719, Jacksonville, Fla.
Packless Metal Hose, Inc., 730 S. Columbus Ave., Mt Vernon, N. Y.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2 Westgate Rd., Addison, Ill.
Palmer Electric Co., Inc., 230 E. Alexandrine, Detroit 1, Mich.
Palmer Mfg. Corp., 2200 W. Fillmore St., Phoenix, Ariz.
Palmer-Shile Co., 16072 Fullerton, Detroit 27, Mich.
Palmer Thermometers, Inc., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Pam Co., The, 1951 N. W. Wilson St., Portland, Ore.
Pangborn Corp., 400 Pangborn Blvd., Hagerstown, Md.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Paragon Electric Co., 1609 Twelfth St., Two Rivers, Wis.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Parish Co., 3310 Burgundy St., New Orleans 17, La.
Parker Boiler Mfg. Co., Sid E., 2035 E. 37th St., Los Angeles 58, Calif.
Parker-Kalon Div., General American Transportation Corp., Clifton, N. J.
Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
Parsons Co., Div. of Koehring Co., 200 N. 8th Ave., E., Newton, Ia.
Partlow Corp., The, 203 Campion Rd., New Hartford, N. Y.
Pastushin Industries, Inc., 5651 W. Century Blvd., Los Angeles 45, Calif.
Patco Mfg. Co., 231 N. Bread St., Philadelphia, Pa.
Patten Co., J. V., Sycamore, Ill.
Patterson-Kelley Co., Inc., The, 465 Warren St., East Stroudsburg, Pa.
Paul-Lewis Laboratories, Inc., 4253 N. Port Washington Rd., Milwaukee 12, Wis.
Paul Valve Corp., 683 Third Ave., New York 17, N. Y.
Payne Company, 855 Anaheim Puente Rd., La Puente, Calif.
Peabody Engineering Corp., 232 Madison Ave., New York 16, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago 18, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St., and Penna. R. R., Philadelphia 40, Pa.
Peden Equipment Co., 4512 Mt. Vernon, Houston, Tex.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Pee Cee Tape & Label Co., 521 N. LaBrea, Los Angeles 36, Calif.
Peer, Inc., 1440 Milton St., Benton Harbor, Mich.
Peerless of America, Inc., 5800 N. Pulaski Rd., Chicago 30, Ill.
Peerless Electric Co., 1401 W. Market St., Warren, O.
Peerless Heater Co., The, Div. of The Eastern Foundry Co., Boyertown, Pa.
Peerless Mfg. Div., Dover Corp., P. O. Box 2015, Louisville 10, Ky.
Peerless Products Div., United Cooling Towers, Inc., 1421 E. Washington Ave., North Little Rock, Ark.
Peerless Pump Div., Food Machinery & Chemical Corp., 301 West Ave. 26, Los Angeles 31, Calif.
Penberthy Mfg. Co., Div. of Buffalo Eclipse Corp., 1242 Holden Ave., Detroit 3, Mich.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Penn Brass & Copper Co., 3800 W. 20th St., Erie, Pa.
Penn Controls, Inc., Goshen, Ind.
Penn Galvanizing Co., 2201 E. Tioga St., Philadelphia 34, Pa.
Penn Instruments Div. of Burgess-Manning Co., 4110 Haverford Ave., Philadelphia 4, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P. O. Box 484, Washington, Pa.
Pennsalt Chemicals Corp., Three Penn Center, Philadelphia 2, Pa.
Penn Ventilator Co., 3252 Goodman, Philadelphia 40, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia 35, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Perfect Circle Corp., Hagerstown, Ind.
Perfecting Service Co., 332 Atlando Ave., Charlotte, N. C.
Perfection Industries Div., Hupp Corp., 1135 Ivanhoe Rd., Cleveland 10, O.
Perfex Plastics, Inc., 2632 S. Dearborn, Chicago, Ill.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Permacel Tape, New Brunswick, N. J.
Permatex Co., Inc., P. O. Box 1, Brooklyn 35, N. Y.
Permutit Co., The, 330 W. 42nd St., New York 36, N. Y.
Perolin Co., Inc., The, 350 Fifth Ave., New York 1, N. Y.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
Petro, 3170 W. 106th St., Cleveland 11, O.
Petroleum Solvents Corp., 331 Madison Ave., New York 17, N. Y.
Petrometer Corp., 43-22 Tenth St., Long Island City 1, N. Y.
Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N. Y.
Phelps Mfg. Co., 715 Thomas St., Little Rock, Ark.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40.
Philadelphia Pump Div., American Meter Co., 13500 Philmont Ave., Philadelphia 16, Pa.
Philadelphia Thermometer Co., 6th & Cayuga St., Philadelphia 40, Pa.
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.
Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 220 Dupont St., Brooklyn 22, N. Y.
Phillips Drill Co., U. S. No. 12 & Liberty Trail, Michigan City, Ind.
Phoenix Brass Fittings Corp., 354-378 Coit St., Irvington 11, N. J.
Phoenix Fan & Blower Mfg. Co., 112 E. 8th Ave., Phoenix, Ariz.
Phoenix Iron & Steel Co., Phoenix Steel Tube Div., Phoenixville, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Mfg. Co., Catasauqua, Pa.
Phoenix Products Co., 4715 N. 27th St., Milwaukee 16, Wis.
Photobell Co., Inc., 43 Vesey St., New York 7, N. Y.
Pick Mfg. Co., West Bend, Wis.
Picker X-Ray Co., 25 S. Broadway, White Plains, N. Y.
Pickett & Eckel, Inc., 1109 S. Fremont, Alhambra, Calif.
Pierce Co., Wm. B., The, 277 Military Rd., Buffalo 7, N. Y.
Piezo Mfg. Corp., 250 Arlington Ave., Staten Island, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pilot Mfg. Co., 3970 Pacific Coast Highway, Torrance, Calif.
Pines Engineering Co., Inc., 685 Walnut St., Aurora, Ill.
Pioneer Furnace Co., 3131 San Fernando Rd., Los Angeles, Calif.
Pioneer Mfg. Co., 3131 San Fernando Rd., Los Angeles, 65, Calif.
Pioneer Tool Co., 908 10th St., Racine, Wis.
Pipe Line Development Co., 5700 Detroit Ave., Cleveland 2, O.
Pipe Plugs, Inc., Wellington, O.
Piper Tool Co., 556 Jefferson Court, Detroit 7, Mich.
Piping Specialties, Inc., 114 Liberty St., New York 6, N. Y.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh 1, Pa.
Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh, Pa.
Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22, Pa.
Pittsburgh Lectrodryer Co., 327 32nd St., Pittsburgh 30, Pa.
Pittsburgh Nipple Wks., Inc., 1455 Spring Garden Ave., Pittsburgh 12, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna Pittsburgh 23, Pa.
Pittsburgh Pipe & Coupling Co., Allison Park, Pa.
Pittsburgh Piping & Equipment Co., 158 49th St., Pittsburgh 1, Pa.
Pittsburgh Plate Glass Co., 632 Ft. Duquesne Blvd., Pittsburgh 22, Pa.
Pittsburgh Steel Co., 800 Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., 212 Wood St., Pittsburgh 22, Pa.
Pittsburgh Valve Co., Reedsville, W. Va.
Pittsfield Products, Inc., 2275 Platt Rd., Ann Arbor, Mich.
Plant Engineering & Equipment Co., 28 Washington Ave., Elizabeth, N. J.
Plasteel Products Corp., McAdam Ave., Washington, Pa.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastex Corp., 3232 Cleveland Ave., Columbus 24, O.

Plastic Products Co., 6467 Georgia Ave., Detroit 11, Mich.
Plastics Div., Eastman Chemical Products, Inc., Kingsport, Tenn.
Plastipipe, Products of Plastic Process Co., Div. of Monadnock Mills, 10400 Aviation Blvd., Los Angeles 45, Calif.
Plibrico Co., 1800 Kingsbury St., Chicago 14, Ill.
Plico-Flex, 5501 Santa Fe Ave., Los Angeles, Calif.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Poe Co., C. W., The, 10526 Wilbur Ave., Cleveland 6, O.
Pokorney Mfg. Co., 3117 Clybourn Ave., Chicago 18, Ill.
Polis Mfg. Co., J. D., 2902-16 W. 26th St., Chicago 23, Ill.
Polymer Corp. of Pa., The, 2120 Fairmont Ave., Reading, Pa.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
Porce-Lin Tank Lining Co., 456 Milwaukee, Detroit, Mich.
Porous Plastic Filter Co., Glen Cove, N. Y.
Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill.
Port City Machine & Tool Co., 3590 Airline Rd., Muskegon, Mich.
Porter-Cable Machine Co., 700 Marcellus St., Syracuse 4, N. Y.
Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 12, N. J.
Porter Co., Inc., H. K., W-S Fittings Div., P. O. Box 95, Roselle, N. J.
Portland Copper & Tank Works, Inc., 80 Second St., South Portland, Me.
Portmar Boiler Co., Inc., 193 Seventh St., Brooklyn 15, N. Y.
Potter & Brumfield Inc., Princeton, Ind.
Potter Company, The, 1950 Sheridan Rd., North Chicago, Ill.
Potts-Farrington Co., 4250 Wissahickon Ave., Philadelphia 29, Pa.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
Power Engineering Corp., 4010 Main St., Weirton, W. Va.
Power-Flame Division Inc., Grandview, Mo.
Powers Regulator Co., 3400 Oakton St., Skokie, Ill.
Prat-Daniel Corp., Thermobloc Div., 2 Meadow St., South Norwalk, Conn.
Pratt Co., Henry, 2222 S. Halsted St., Chicago 8, Ill.
Precision Parts Corp., 400 N. First St., Nashville 7, Tenn.
Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia 30, Pa.
Precision Welder Mfg. Co., 2218 W. Lake St., Chicago 12, Ill.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Premier Co., 755 Woodlawn Ave., St. Paul 1, Minn.
Prepo Corp., Edgerton, Wis.
Presstite-Keystone Engineering Products Co., A Div. of American-Marietta Co., 3900 Chouteau Ave., St. Louis 10, Mo.
Pressure Airduct Corp., 8130 N. St. Louis, Skokie, Ill.
Price Brothers, E. Monument Ave., Dayton, O.
Price Pump Co., E. L., Box 357, Sonoma, Calif.
Primor Products Div., Borg-Warner Corp., 2011 W. Beecher Rd., Adrian, Mich.
Pritchard & Co. of California, J. F., 4625 Roanoke Parkway, Kansas City 12, Mo.
Process Engineering, Inc., Foot of Chase St., Methuen, Mass.
Procon Pump & Engineering Co., 12721 Capitol Ave., Oak Park 37, Mich.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
Production Stamping Co., 2316 S. 24th St., Omaha, Nebr.
Products Research Co., 3126 Los Feliz Blvd., Los Angeles 39, Calif.
Propellair Div., Robbins & Myers Inc., 1345 Lagonda Ave., Springfield, O.
Proportioneers, Inc., Div. of B-I-F Industries, Inc., 381 Harris Ave., Providence, R. I.
Protective Closures Co., Inc., CaPlugs Div., 2207 Elmwood Ave., Buffalo 22, N. Y.
Protokap, Inc., 625 West Building, Houston, Tex.
Proto Tool Co., Div. of Pendleton Tool Industries, Inc., 2209 Santa Fe Ave., Los Angeles, Calif.
Prox Company, Inc., Frank, 1201 S. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20.
Pullman Vacuum Cleaner Co., 25 Buick St., Boston 19, Mass.
Pulverizing Machinery Div., Metals Disintegrating Co., Inc., 96 Chatham Rd., Summit, N. J.
Punch-Lok Co., 321 N. Justine St., Chicago 7, Ill.
Pure Carbonic Co., Div. of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.
Purolator Products, Inc., 970 New Brunswick Ave., Rahway, N. J.
Pyle-National Co., The, 1373 N. Kostner Ave., Chicago 51, Ill.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago 7, Ill.
Pyramid Plastics, Inc., 554 W. Polk St., Chicago, Ill.
Pyrene CO TWO, U. S. Route 1, Newark, N. J.
Pyrne & Co., Inc., 140 N. Towne Ave., Pomona, Calif.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.

Q

Q-P Mfg. Co., Needham Heights, Mass.
Quaid Fabrications, Inc., State Highway 73, Palmyra, N. J.
Quaker City Iron Wks., Allegheny & Tulip St., Philadelphia 34, Pa.
Quaker Rubber Div., H. K. Porter Co., Tacony & Comly Sts., Philadelphia 24, Pa.
Quality Specialty Co., Inc., 28th & Lincoln Ave., Camden 5, N. J.
Queen City Engineering Co., Old Pineville Rd., P. O. Box 3103, Charlotte, N. C.
Quickdraft Co., Dueber-Hampden Bldg., P. O. Box 87-K, Canton, O.
Quick Joint Div., Automatic Bending Co., 469 E. 159th St., Harvey, Ill.
Quickwork Div., Whiting Corp., Harvey, Ill.
Quiet Automatic Oil Burner Corp., 33 Bloomfield Ave., Newark 4, N. J.
Quigley Co., Inc., 415 Madison Ave., New York 17, N. Y.

R

R C S Tool Corp., 227-229 East Front St., P. O. Box 661, Bloomington, Ill.
R. I. Humidifier & Ventilating Co., Inc., 65 Landsdowne St., Cambridge 39, Mass.
R.K.L. Valve & Mfg. Co., Route 38 & Rudderow Ave., Maple Shade, N. J.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Radex Corp., 2076 N. Elston Ave., Chicago 14, Ill.
Radiant Baseboard Panels, Inc., 464 Hartford Ave., Newington, Conn.
Radiant Devices, 4030 Chouteau Ave., St. Louis, Mo.
Radiant Heat & Cooling Co., 795 Kifer Rd., Santa Clara, Calif.
Radiant Panel Mfg. Co., 9 E. Pearl St., Torrington, Conn.
Radiant Utilities Corp., 8817-18th Ave., Brooklyn 14, N. Y.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Radio Corp. of America, RCA Victor Div., Front & Cooper, Camden, N. J.
Radio Corp. of America, Engineering Products Dept., Camden, N. J.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramco Equipment Corp., 1373 Lafayette Ave., New York 59, N. Y.
Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp., 12117 Berea Rd., Cleveland 11, O.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco Inc., 601 W. 5th Ave. Columbus, O.
Randall Graphite Bearings, Inc., Greenlawn & Lake Sts., Lima, O.
Randolph-Page, Inc., 175 Fifth Ave., New York 10, N. Y.
Ransome Co., 4030 Hollis St., Emeryville, Calif.
Ra-Rich Mfg. Corp., Holtsville, Long Island, N. Y.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., The, 200 Petersville Rd., New Rochelle, N. Y.
Ray Oil Burner Co., 1301 San Jose Ave., San Francisco 12, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Rayfield-Staffco Burner Co., 2066 Canalport, Chicago 8, Ill.
Raymond Div., Combustion Engineering, Inc., 1324 N. Branch St., Chicago, Ill.
Raypak Co., Inc., 4560 Worth St., Los Angeles, Calif.
Reading Tube Corp., 350 - 5th Ave., New York, N. Y.
Ready-Power Co., The, 11231 Freud Ave., Detroit 14, Mich.
Reco Products Div., Recony Corp., 150 Nassau St., New York 38, New York.
Recold Corp., 7250 E. Slauson Ave., Los Angeles 22, Calif.
Recoy Div. of Schemenauer Mfg. Corp., Holland, O.
Rector Mineral Trading Corp., 551 Fifth Ave., New York 17, N. Y.
Rectorseal Div., Rector Well Equipment Co., 2215 Commerce St., Houston 2, Tex.
Red Jacket Co., Inc., 513 Bell Ave., Carnegie, Pa.
Red Jacket Mfg. Co., 1051 S. Rolff St., Davenport, Ia.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redi-Bolt, Inc., 5334 Indianapolis Blvd., East Chicago, Ind.
Redmond Co., Inc., Owosso, Mich.
Reed Mfg. Co., 1425 W. 8th St., Erie, Pa.
Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pulley Co., Div. of Reliance Electric & Engineering Co., Columbus, Ind.
Reeves Steel & Mfg. Co., Dover, O.
Reflectal Corp. Subsid., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Reflectotherm, Inc., 26 East Unversity Ave., Cincinnati 19, O.
Reflin Co., 5730 Kearney Villa Rd., San Diego 11, Calif.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigerating Specialties Co., 3004 W. Lexington St., Chicago, Ill.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago, Ill.
Refrigeration Devices Co., 51 E. Centre St., Nutley 10, N. J.
Refrigeration Research, Inc., 9901 East Grand River, Brighton, Mich.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 20, N. Y.
Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn 11, N. Y.
Reichert Float & Mfg. Co., 2242 Smead Ave., Toledo 6, O.
Reif-Rexoil, Inc., 37-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 19 Euclid Ave., P. O. Box 5035, Newark 5, N. J.
Reintjes Co., Geo. P., 2517-19 Jefferson St., Kansas City, Mo.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Instrument Mfg. Corp., 190 Glen Cove Ave., Glen Cove, Long Island, N. Y.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago.
Remco, Inc., Zelienople, Pa.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Remington Arms Co., Inc., Bridgeport, Conn.
Rempe Co., 342 N. Sacramento Blvd., Chicago 12, Ill.
Rentip, Inc., R.R. No. 4, Osborne Rd., Knoxville, Tenn.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago 47, Ill.
Republic Mfg. Co., 15655 Brookpark Rd., Cleveland 11, O.
Republic Products Co., 7420 State Rd., Philadelphia 36, Pa.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 1, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13.
Republic Steel Corp., Steel & Tubes Div., 228 E. 131st St., Cleveland 8, O.
Research Appliance Co., Rt. 8 at Craighead Rd., Box 307, Allison Park, Pa.
Research-Cottrell, Inc., Bound Brook, N.J.

Research Products Corp., 1015 E. Washington Ave., Madison 10, Wis.
Research Vacuum Supply Co., 6712 N. Clark St., Chicago 26, Ill.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Roseland, N. J.
Resolite Corp., Zelienople, Pa.
Reuland Electric Co., 3001 W. Mission Rd., Alhambra, Calif.
Revcor Inc., Carpentersville, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Revere Copper & Brass, Inc., Standard Rolling Mills Div., 196 Diamond St., Brooklyn 22, N. Y.
Rex Clay Products Co., 7717 Lyndon, Detroit 38, Mich.
Rex Roto Corp., 1109 Decker Rd., Walled Lake, Mich.
Rex Welder Company, 1200-1248 Milton St., Benton Harbor, Mich.
Reynolds Electric Co., 3000 River Rd., River Grove, Ill.
Reynolds Mfg. Co., The, Box 333, Comstock Park, Mich.
Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.
Reynolds Water Conditioning Co., 12100 Cloverdale Ave., Detroit 4, Mich.
Reznor Mfg. Co., 51 Union St., Mercer 8, Pa.
Rheem Mfg. Co., 7600 Kedzie Ave., Chicago 29, Ill.
Rhoads & Sons, J. E., 2100 W. 11th St., Wilmington 99, Del.
Rhode Island Fittings Co., 355 Dexter St., Providence 7, R. I.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Rhopac, Inc., 3425 Cleveland St., Skokie, Ill.
Richmond Engineering Co., 7th and Hospital Sts., Richmond, Va.
Richmond Foundry & Mfg. Co., Inc., The, Hermitage Rd., Richmond, Va.
Richmond Plumbing Fixtures Div., Rheem Mfg. Co., Box 111, Metuchen, N. J.
Richmont, Inc., 922 S. Myrtle Ave., Monrovia, Calif.
Ric-wiL, Inc., Barberton, O.
Ridge Tool Co., Clark St., Elyria, O.
Rigidbilt Inc., 2850 W. Fulton St., Chicago 12, Ill.
Rigidized Metals Corp., 721 Ohio St., Buffalo 3, N. Y.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Rinehart Inc., 511-513 Main St., Richmond, Ind.
Ripley Co., Inc., Middletown, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Rite Engineering & Mfg. Corp., 9441 Washburn Crossing Rd., Downey, Calif.
Ritter Pattern & Casting Co., Inc., 120 Walker St., New York 13, N. Y.
Rittling Corp., The, Rittling Bldg., Buffalo 5, N. Y.
Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.
Roberson, Inc., 1539 E. 103rd St., Seattle 55, Wash.
Robert Mfg. Co., 9035 Venice Blvd., Los Angeles 34, Calif.
Roberts-Gordon Appliance Corp., 44 Central Ave., Buffalo 6, N. Y.
Roberts Tube Div., Prestyle Mfg. Co., 6100 Ranspach Ave., Detroit, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa.
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.
Robinson Clay Product Co., The, 65 W. State St., Akron 9, O.
Robinson Corp., P. O. Box 709, Somerville, N. J.
Robinson Industries, Coleman, Mich.
Robinson Ventilating Co., Zelienople, Pa.
Robvon Backing Ring Co., 675 Garden St., Elizabeth 2, N. J.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y.
Rochester Mfg. Co., Inc., 63 Rockwood St., Rochester 10, N. Y.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockford Brass Works, 700 S. Main, Rockford, Ill.
Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.
Rockwell Co., W. S., 2545 Eliot St., Fairfield, Conn.
Rockwell Mfg. Co., Meter & Valve Div., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Roddick Tool Co., P. O. Box 109, Anaheim, Calif.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg, Pittsburgh 15, Pa.
Roller Bearing Co. of America, Sullivan Way, West Trenton, N. J.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Ronor Corp., 1360 W. 9th St., Cleveland 13, O.
Roots-Connersville Blower, Div. of Dresser Industries, Inc., 900 W. Mount St., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 17th St., S.E., Salem, Ore.
Rosedale Foundry & Machine Co., 1731 Preble Ave., N.S., Pittsburgh, Pa.
Ross Heat Exchanger Div., American Radiator & Standard Sanitary Corp., Box 2081, Buffalo 5, N. Y.
Ross Sprinkler Co., 4333 Temple City Blvd., Rosemead, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Concrete Drill Co., 650 S. Arroyo Pkwy., Pasadena, Calif.
Rotary Seal Div., Muskegon Piston Ring Co., 2020 N. Larrabee St., Chicago 14, Ill.
Roth Co., Roy E., 2420-A 24th Ave., Rock Island, Ill.
Rotherm Engineering Co., Inc., 7280 W. Devon, Chicago, Ill.
Rotometals, 980 Harrison St., San Francisco 7, Calif.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, O.
Rotron Controls Corp., Woodstock, N. Y.
Round Oak Co., Inc., Dowagiac, Mich.
Royal Mfg. Corp., Waterloo, Ind.
Royalton Co., Inc., Gasport, N. Y.
Royco Instruments, 720 Arthur St., Albany, Calif.
Royersford Foundry & Machine Co., Inc., 101-131 Main St., Royersford, Pa.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubber & Asbestos Corp., 225 Belleville Ave., Bloomfield, N. J.
Rubber & Plastics Compound Co., 10 Rockefeller Plaza, New York 20, N. Y.
Rubber Products Div., Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, O.
Ruberoid Co., 500 Fifth Ave., New York 36, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 16, O.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 110 Tremont St., Boston, Mass.
Ruppright's Rotary Roof Cooler, Box 43555, Los Angeles 43, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell Co., F. C., The, 1100 Chester Ave., Clevelend 1, O.
Rust-Oleum Corp., 2425 Oakton St., Evanston, Ill.
Ruthman Machinery Co., 1809 Reading Rd., Cincinnati 2, O.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
Ruud Mfg. Co., Kalamazoo, Mich.
Ryerson & Son, Inc., Joseph T., 2558 W. 16th, Chicago, Ill.

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S&C Mfg. Co., 6245 Wiehe Rd., Cincinnati, O.
SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 32, Pa.
S.O.S. Products Co., Inc., 346 Cumberland St., Brooklyn 38, N. Y.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
St. Clair Rubber Co., 440 E. Jefferson, Detroit, Mich.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., 1948 N. 9th St., St. Louis 6.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., S. Wabasha and Water Sts., St. Paul 1.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kan.
Sall Bros. Co., 2320 Kishwaukee St., Rockford, Ill.
Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1, Calif.
Salton Mfg. Co., Inc., 312 E. 95th St., New York 28, N. Y.
Sampson Scientific Co., Div. of the Sampson Chemical & Pigment Corp., 2830 W. Lake St., Chicago 12, Ill.
San Angelo Foundry & Machine Co., P. O. Box 1152, San Angelo, Tex.
San Gabriel Boiler Mfg. Co., 330 S. Del Mar Pl., P. O. Box 2, San Gabriel, Calif.
Sandee Mfg. Co., 5050 W. Foster Ave., Chicago 30, Ill.
Sandstrom Products Co., Port Byron, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Saran Lined Pipe Co., 2415 Burdette Ave., Ferndale 20, Mich.
Sarco Co., Inc., 635 Madison Ave., New York 22, N. Y.
Sarcotherm Controls, Inc., 635 Madison Ave., New York 22, N. Y.
Sargent Enginairing Co., 1375 E. 45th St., Cleveland 3, O.
Sauereisen Cements Co., 1045 North Canal St., Pittsburgh 15, Pa.
Saunders Mfg. Co., 25 Atherton St., Yonkers, N. Y.
Saussé & Co., M. W., 636 N. Robertson Blvd., Los Angeles 46, Calif.
Saverite Engineering Co., 158 - 14th St., Hoboken, N. J.
Sawhill Tubular Products, Inc., P. O. Box 546, Sharon, Pa.
Scaico Controls Inc., P. O. Box 41, Cooper St., Delanco, N. J.
Scaife Co., 26 Ann St., Oakmont, Pa.
Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaevitz Engineering, P. O. Box 505, Camden 1, N. J.
Schaible Co., The, 5801 Mariemont Ave., Mariemont 27, O.
Scharer & Co., Ray A., 3000 East Grand Blvd., Detroit 2, Mich.
Scharf Mfg. Co., J. H., 6120 Binney St., Omaha, Nebr.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
Schaub Engineering Co., Fred H., 2110 S. Marshall Blvd., Chicago 23.
Schaul Mfg. Co., 6300 Rowland Ave., Cleveland 27, O.
Schieren Co., Chas. A., 1300 Walnut St., Camden 3, N. J.
Schlegel Mfg. Co., 1555 Jefferson Rd., Rochester 25, N. Y.
Schild Mfg. Co., 4127 — N. 60th St., Milwaukee 16, Wis.
Schmieg Industries, Inc., P. O. Box 4701, Detroit 34, Mich.
Schnacke, Inc., 1101 N. Governor St., Evansville, Ind.
Schneible Co., Claude B., P. O. Box 296, Roosevelt Pk. Annex, Detroit 32, Mich.
Schoedinger, Inc., F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schurs Oil Burner Co., 8500 Zamore Ave., Los Angeles 1, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Schwitzer Corp., 1125 Massachusetts Ave., Indianapolis 7, Ind.
Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill.
Scientific Instrument Co., 617 Howard St., Detroit 26, Mich.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Scovill Mfg. Co., Waterville Div., Waterville 14, Conn.
Screw Machine Products Co., 7737 N. E. Killingsworth, P. O. Box 7497, Portland 20, Ore.
Scully Signal Co., 174 Green St., Melrose 76, Mass.
Sealed Power Corp., 2001 Sanford St., Muskegon 61, Mich.
Sealed Unit Parts Co., Inc., 261 E. 161st St., Bronx 51, N. Y.
Sealmaster Bearings, Div. of Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.
Sealol Corp., Warwick Industrial Park, Providence 5, R. I.
Seamless Rubber Co., The, F.O.S. Industrial Tape Div., 464 Congress Ave., New Haven 3, Conn.
Seamlex Co., Inc., 41-23 24th St., Long Island City 1, N. Y.
Security Valves Corp., 541 W. Garfield, Glendale, Calif.
Seelye Craftsmen, The, 984 Central Ave., Minneapolis, Minn.
Seiberling Rubber Co., Plastics Div., Newcomberstown, O.
Selas Corp. of America, Dresher, Pa.
SelecTemp Div., Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11, O.
Self Cleaning Strainer Co., 4545 Southwest Highway, Oak Lawn, Ill.
Sellers Engineering Co., 4874-76 N. Clark St., Chicago 40, Ill.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Serdex, Inc., 12 Bowdoin Square, Boston 14, Mass.
Sethco Mfg. Co., 2284 Babylon Turnpike, Merrick, N. Y.
Seton Name Plate Co., 431-B W. Rock Ave., New Haven 15, Conn.
Sette Products Co., 1241 High St., Oakland 1, Calif.
Sexauer Mfg. Co., Inc., J. A., Dept. 19, 2503-05 3rd Ave., New York 51, N. Y.

Shafer Bearing, Div. of Chain Belt Co., 801 Burlington Ave., Downers Grove, Ill.
Shahmoon Industries, Inc., Warren Foundry & Pipe Div., 55 Liberty St., New York 5, N. Y.
Shakeproof Div., Illinois Tool Wks., St. Charles Rd., Elgin, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 43, Pa.
Shallcross Controls, Inc., P. O. Box 497, Markesan, Wis.
Shank Co., Cyrus, 4646 W. 12th Pl., Chicago 50, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del.
Shaw-Kendall Engineering Co., 128 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., 201 E. Carson St., Pittsburgh 19, Pa.
Sheldon Equipment Co., E. H., 716 Nims St., Muskegon, Mich.
Shell Oil Co., Lubricants Dept., 41-70 Main St., Flushing 55, N. Y.
Sherwin-Williams Co., The, 101 Prospect Ave., N. W., Cleveland, O.
Sherwood Water Treatment Co., Inc., Beverly, N. J.
Shutt Process Equipment Corp., 1421 Norman Place, St. Louis 22, Mo.
Sier Bath Gear & Pump Co., Inc., 9261 Hudson Blvd., North Bergen, N. J.
Sight Feed Generator Co., P. O. Box 38, West Alexandria, O.
Signal Electric Div. of King-Seeley Corp., Menominee, Mich.
Signal Indicator Corp., 42 Stewart Ave., Brooklyn 37, N. Y.
Sikes Co., S. R., 1028 S. Third St., Minneapolis 15, Minn.
Silvercote Products, Inc., 161 E. Erie St., Chicago 11, Ill.
Silvercraft, Inc., 120 S. Floyd St., Louisville, Ky.
Simplaire, 521 Fifth Ave., New York 17, N. Y.
Simplex Ceiling Corp., 552 W. 52nd St., New York 19, N. Y.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 7901 Oxford, Philadelphia 11, Pa.
Simplex Valve & Meter Co., 7 E. Orange St., Lancaster, Pa.
Simpson Electric Co., 5208 W. Kinzie, Chicago, Ill.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sims Pump Valve Co., 1314 Park Ave., Hoboken, N. J.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010, Pittsburgh 16, Pa.
Skidmore Corp., P. O. Box 309, St. Joseph, Mich.
Skil Corp., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., 3502 W. Sample, South Bend 21, Ind.
Skinner Div., Bendix Aviation Corp., Tibbits Ave., Green Island, N. Y.
Skinner Electric Valve Div., The Skinner Chuck Co., Edgewood Ave., New Britain, Conn.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
Skinner Irrigation Co., 121 E. Canal St., Troy, O.
Skuttle Mfg. Co., Milford, Mich.
Skyline Industries Sales, Inc., Titusville, Pa.
Slant-Fin Radiator Corp., 87-49 130th St., Richmond Hill 18, N. Y.
Sloane Mfg. Co., 7606 No. Clybourn Ave., Sun Valley, Calif.
Sly Mfg. Co., W. W., 4700 Train Ave., P. O. Box 5939, Cleveland 1, O.
Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill.
Smith-Blair, Inc., 535 Railroad Ave., S. San Francisco, Calif.
Smith Bros. Co., 414 S. Harvey, Oak Park, Ill.
Smith Chemical Co., E. W., 15020 E. Proctor Ave., La Puente, Calif.
Smith Co., Inc., H. B., The, 64 Main St., Westfield, Mass.
Smith Co., J. B., 3327 B St., Philadelphia 34, Pa.
Smith Co., S. Morgan, Lincoln & Hartley Sts., York, Pa.
Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis.
Smith Corp., A. O., Electric Motor Div., 531 No. 4th St., Tipp City, O.
Smith Filter Corp., 1603-2nd Ave., Moline, Ill.
Smith & Kanzler Corp., E. Linden Ave., Linden, N. J.
Smith Products Co., 43642 Nine Mile Rd., Northville 1, Mich.
Smith Twin Tubular Boiler Co., Inc., Cottman St. at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-on Tools Corp., Kenosha, Wis.
Snap-Tite, Inc., Union City, Pa.
Socony-Mobil Oil Co., Inc., 150 E. 42nd St., New York 17, N. Y.
Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill.
Solar Aircraft Co., 2200 Pacific Highway, San Diego 12, Calif.
Soldering Specialties Co., 19 Chatam Rd., Summit, N. J.
Solfo Paint Mfg. Co., Trenton 3, N. J.
Solvay Process Div., Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.
Somers Corp., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Works, Inc., Chattanooga, Tenn.
Sonneborn Sons, Inc., L., Building Products Div., 404 Fourth Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
Sonoco Products Co., Hartsville, S.C.
Sostman & Co., H. E., 347 E. Lincoln Ave., Cranford, N. J.
South Bend Air Products, Inc., 322 E. Colfax Ave., South Bend 22, Ind.
South Chester Corp., Southco Div., Lester, Pa.
South Chester Tube Co., Finance Bldg., Philadelphia 2, Pa.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southern Plastics Co., 408 Pendleton, Columbia, S. C.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Southwestern Plastic Pipe Co., P. O. Box 117, Mineral Wells, Tex.
Southworth Machine Co., 30 Warren Ave., Portland, Me.
Span Brass Mfg. Co., Wilmot St., Otsego, Mich.
Spang-Chalfant, Div. of The National Supply Co., P. O. Box 416, Pittsburgh 30, Pa.
Sparkler Mfg. Co., Mundelein, Ill.
Spartan Convector Co., Inc., 52-55 74th St., Maspeth 78, N. Y.
Spartan Tool Co., 1918 Columbia Ave., Chicago 26, Ill.
Sparton Corp., 2301 E. Michigan, Jackson, Mich.
Special Chemicals Corp., 100 S. Water St., Ossining, N. Y.
Special Screw Products, Box 391, Bedford, O.
Speco, Inc., 7308 Associate Ave., Cleveland 9, O.
Speedline Stainless Steel Fittings Div., Horace T. Potts Co., Erie Ave. & "D" St., Philadelphia 34, Pa.
Speed Selector Inc., P. O. Box 312, Chagrin Falls, O.
Speedway Mfg. Co., Div. of Thor Power Tool Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
Speed-Seam Co., 820 N. Walcott, Chicago 22, Ill.
Spence Engineering Co., Inc., 32 Grant St., Walden, N. Y.
Spencer Heater, Lycoming Div., Avco Mfg. Corp., 652 Oliver St., Williamsport, Pa.
Spencer Thermostat Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sperti Faraday, Inc., 1322 E. Church St., Adrian, Mich.
Sperti Faraday, Inc., 720 Grand St., Hoboken, N. J.
Spi-Rol-Fin Corp., 133 Greenwood Ave., Pequannock, N. J.
Spincraft, Inc., 4160 W. State St., Milwaukee, Wis.
Spindler & Sons, Inc., August, Mercer St., Jersey City 2, N. J.
Sponge Products Div., B. F. Goodrich Co., Derby Place, Shelton, Conn.
Sporlan Valve Co., 7525 Sussex Ave., St. Louis 17, Mo.
Sprague Electric Co., Marshall St., North Adams, Mass.
Spray Engineering Co., 100 Cambridge St., Burlington, Mass.
Spraying Systems Co., 3219 Randolph St., Bellwood, Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Spring Packing Corp., 332 S. Michigan Ave., Chicago, Ill.
Springfield Boiler Co., 1939 E. Capitol Ave., Springfield, Ill.
Springload Mfg. Corp., 6332 Maynard Ave., Seattle 8, Wash.
Sprout, Waldron & Co., Inc., Muncy, Pa.
Spurgeon Co., 23501 Hoover Rd., Warren, Mich.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, 18502 Syracuse Ave., Cleveland 10, O.
Stainless Processing Div., Wall Colmonoy Corp., 19345 John R St., Detroit, Mich.
Stalwart Rubber Co., The, 381 Northfield Rd., Bedford, O.
Stamco Inc., New Bremen. O.
Stanat Mfg. Co., Inc., 500 Shames Dr., Westbury, N. Y.
Standard Asbestos Mfg. Co., 860 W. Evergreen Ave., Chicago 22, Ill.
Standard Electric Mfg. Co., West Berlin, N. J.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., S., Detroit 17, Mich.
Standard Instrument Div., Heat Timer Corp., 657 Broadway, New York 1, N. Y.
Standard Machine & Mfg. Co., 704 East Big Bend Blvd., St. Louis 22, Mo.
Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.
Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill.
Standard Pressed Steel Co., Box 810, Jenkintown, Pa.
Standard Refrigeration Co., 3535 W. Fillmore St., Chicago 24, Ill.
Standard Reseater Co., 423 W. 126th St., New York 27, N. Y.
Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit 39, Mich.
Stanley Electric Tools, Div. of The Stanley Works, Myrtle St., New Britain, Conn.
Stanley Works, The, 195 Lake St., New Britain, Conn.
Staples & Pfeiffer, 528 Bryant St., San Francisco 7, Calif.
Sta-Rite Products, Inc., 305 S. 8th St., Delavan, Wis.
Star Expansion N. Y., Inc., 142 Liberty St., New York 6, N. Y.
Star-Kimble Electric Co., Div. of Safety Industries, Inc., 1187 Dixwell Ave., Hamden, Conn.
Star Stainless Screw Co., 646 Union Blvd., Paterson 2, N. J.
Star Tubular Products Co., 4747 S. Richmond St., Chicago, Ill.
Star Woolen Co., Cohoes, N. Y.
Steam Turbine Div., Worthington Corp., Wellsville, N. Y.
Stearns Co., N. C., P. O. Box 1234, Shreveport, La.
Stedco Products, 71 Lehigh St., Wilkes-Barre, Pa.
Steel City Electric Co., 1207 Columbus Ave., Pittsburgh, Pa.
Steelcote Mfg. Co., 3418 Gratiot St., St. Louis, Mo.
Steel Improvement & Forge Co., The, 970 E. 64th St., Cleveland 3, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Steffan Engineering, 290 W. 10th St., Salem, O.
Steinen Mfg. Co., Wm., 43 Bruen St., Newark 5, N. J.
Sterlairco, Inc., 265 N. Elm St., Westfield, Mass.
Sterling, Inc., 5200 W. Clinton Ave., Milwaukee 18, Wis.
Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
Sterling Radiator Co., Inc., 260 N. Elm St., Westfield, Mass.
Sterns-Flinn Corp., 30 Church St., New York 7, N. Y.
Stevens Mfg. Co., Inc., P. O. Box 1007, Mansfield, O.
Stewart Ice Machine Co., 1282 W. 1st St., Pomona, Calif.
Stewart Mfg. Co., Inc., P. O. Box 86, Kinston, N. C.
Stewart-Warner Corp., South Wind Div., 1514 Drover St., Indianapolis, Ind.
Stewart-Warner Corp., Heating & Air Conditioning Div., Lebanon, Ind.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 18, Ind.
Stic-Klip Mfg. Co., Inc., 112 Regent St., Cambridge 40, Mass.
Stiles Karlsonite Corp., 1550 Grand Ave., Waukegan, Ill.
Stillwater Clay Products Co., The, 3334 Prospect Ave., Cleveland 15.
Stockham Valves & Fittings, Box 2592, Birmingham 2, Ala.
Stoddard Industries, Inc., 1545 N. Kingsbury, Chicago 22, Ill.
Stokes Molded Products, Div. of Electric Storage Battery Co., Taylor & Webster, Trenton 4, N. J.
Stout & Sons, David, 7016-7020 Manchester Blvd., St. Louis 17, Mo.
Stover Water Softener Co., 10 State Ave., St. Charles, Ill.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Strahman Valves, Inc., 16-22 Hudson St., New York 13, N. Y.

Straitsville Brick Co., New Straitsville, O.
Stratford Pipe Scalloper Co., 1105 Ewing Ave., Clearwater, Fla.
Strong, Carlisle & Hammond, 1392 W. Third St., Cleveland 13, O.
Struthers-Dunn, Inc., Lamb's Rd., Pitman, N. J.
Struthers Wells Corp., Warren, Pa.
Sturtevant Co., P. A., Addison, Ill.
Sub-Zero Freezer Co., Inc., Route 3, P. O. Box 2017, Madison, Wis.
Sudbury Laboratory, Sudbury, Mass.
Sulflo, Inc., 1143 E. Jersey St., Elizabeth 4, N. J.
Sullivan Valve & Engineering Co., 1400 E. Second St., Butte, Mont.
Summit Products Co., Uniontown, Pa.
Sumo Pumps, Inc., 23 Brown House Rd., Stamford, Conn.
Sundial Electric Co., 87-49 130th St., Richmond Hill 18, N. Y.
Sundstrand Hydraulic Div., 2210 Harrison Ave., Rockford, Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.
Sun-Ray Burner Mfg. Corp., 139-24 Queens Blvd., Jamaica 35, N. Y.
Sunwarm, Inc., P. O. Box 263, Kingsport, Tenn.
Super Radiator Corp., 6714 Walker St., St. Louis Park, Minneapolis 26, Minn.
Super Slugger Co., 1020 Broadway, Bedford, O.
Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.
Superior Clay Corp., The, Uhrichsville, O.
Superior Combustion Industries, Inc., Times Tower, Times Sq., New York 36, N. Y.
Superior Tube Co., Box 191, Norristown, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
Surface Chemicals, Inc., 1101 Thompson Ave., McKees Rocks, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutorbilt Corp., Subsidiary of Fuller Co., 2966 E. Victoria St., Compton, Calif.
Sutton Corp., O. A., The, 1812 W. Second St., Wichita 2, Kan.
Swaby Mfg. Co., 3818 W. Armitage Ave., Chicago 47, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
Swartwout Co., The, 18511 Euclid Ave., Cleveland 12, O.
Swepco Tube Corp., 1 Clifton Blvd., Clifton, N. J.
Swift & Co., Adhesive Products Dept., 4115 S. Packers Ave., Chicago 9, Ill.
Swift Lubricator Co., Inc., 19 James Bldg., Elmira, N. Y.
Swift Mfg. Co., Inc., 31241 Stephenson Highway, Royal Oak, Mich.
Synchronous Flame, Inc., Walworth, Wis.
Synchro-Start Products, Inc., 8151 N. Ridgeway Ave., Skokie, Ill.
Syncromatic Corp., Watertown, Wis.
Syntron Co., 161 Lexington Ave., Homer City, Pa.
Syrall Mfg. Co., 511 N. State St., Syracuse 3, N. Y.

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Taber Pump Co., 272 Elm St., Buffalo 3, N. Y.
Taco Heaters, Inc., 1160 Cranston St., Cranston 9, R. I.
Taft-Jenkins Co., Inc., Holyoke, Mass.
Tal Bending Equipment Co., 417 N. Water St., Milwaukee 2, Wis.
Taller & Cooper, Inc., 75 Front St., Brooklyn 1, N. Y.
Talon Tools, Inc., North Arlington, N. J.
Tamms Industries Co., 228 N. LaSalle St., Chicago 1, Ill.
Tapecoat Co., The, 1523 Lyons St., Evanston, Ill.
Taylor Co., Halsey W., 1259 N. Park Ave., Warren, O.
Taylor Engineering Corp., 6500 Epworth Blvd., Detroit 10, Mich.
Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., The Charles, 710 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Filter Co., 2719 S. Poplar Ave., Chicago, Ill.
Technical Ply-Wood Sales, 6756 Crandon Ave., Chicago 49, Ill.
Techniflex Corp., Port Jervis, N. Y.
Tech-Tron Corp., 2205 Haskell Ave., Lawrence, Ks.
Tecumseh Products Co., Tecumseh, Mich.
Tedco Cooling Towers, Div. of Engineering & Development Co., Inc., 2406 S. 7th Blvd., St. Louis, Mo.
Tedd Company, The, P. O. Box 1621, Rockford, Ill.
Tejax Engineering Corp., P. O. Box 348, Pawtucket, R. I.
Teleflex Incorporated, P. O. Box 218, North Wales, Pa.
Telsco Fittings Div., 5422 Redfield St., Dallas, Tex.
Temco, Inc., 4101 Charlotte, Nashville, Tenn.
Temploc, Inc., 4249 N. Elton Ave., Baldwin Park, Calif.
Tempo Products Co., 6515 Carnegie Ave., Cleveland 3, O.
Temprite Products Corp., Dept. HPAC, E. Maple Rd., Birmingham, Mich.
Temtrol, Inc., Okarche, Okla.
Tennessee Coal & Iron Div., United States Steel Corp., P. O. Box 599, Fairfield, Ala.
Tennessee Plastics, Inc., P. O. Box 786, Johnson City, Tenn.
Tennessee Products and Chemical Corp., First American National Bank Bldg., Nashville, Tenn.
Tenney Engineering, Inc., 1090 Springfield Rd., Union N. J.
Termite Drills, Inc., 90 N. Lotus Ave., Pasadena 8, Calif.
Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Tesco Inc., 1403 E. 5th Court, Tulsa, Okla.
Texas Co., The, 135 E. 42nd St., New York 17, N. Y.
Texas Vitrified Pipe Co., Mineral Wells, Tex.
Texsteam Corp., P. O. Drawer 9127, Houston 11, Tex.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermador Electrical Mfg., 5119 S. District Blvd., Los Angeles 22.
Thermal Agency, 11 N. Jackson, Houston, Tex.
Thermal Engineering Corp., 2605 W. Dallas, Houston 19, Tex.
Thermo Electric Co., Inc., Saddle Brook, N. J.
Thermoid Co., 200 Whitehead Road, Trenton, N. J.
Thermo King Corp., 44 S. 12th St., Minneapolis, Minn.
Thermo-Products, Inc., North Judson, Ind.
ThermoRay Corp., 26 Ave. B, Newark, N. J.
Thermo-Sound Products, Div. of Kittell-Lacy, Inc., 10816 E. Fawcett Ave., El Monte, Calif.
Thermotank, Inc., Products Div., 11191 Lappin Ave., Detroit 34, Mich.
Therm-O-Wheel, Inc., 1040 B-22 St., Far Rockaway 91, N. Y.
Thern Machine Co., 3760 W. Fourth St., Winona, Minn.
Thomas Co., Arthur H., Vine Street at Third, Philadelphia 5, Pa.
Thomas Flexible Coupling, Main Ave. & Biddle St., Warren, Pa.
Thomas Industries, Inc., Electric Sprayit Div., 1415-25 Illinois Ave., Sheboygan, Wis.
Thompson and Co., 1085 Allegheny Ave., Oakmont, Pa.
Thompson & Son Co., The Henry G., 277 Chapel St., New Haven, Conn.
Thompson Research & Mfg. Co., Davenport, Fla.
Thomson Electric Welder Co., 161 Pleasant St., Lynn, Mass.
Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill.
Thor Tool & Die Co., 865 Estabrook, San Leandro, Calif.
Thread-Ezy Mfg. Co., Corunna, Mich.
Threadwell Tap & Die Co., Greenfield, Mass.
Three Point Industries, 1821 Howard St., Evanston, Ill.
Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Ave., Philadelphia 44, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Timken Roller Bearing Co., The, 1835 Dueber Ave., S. W., Canton 6, O.
Timken Silent Automatic Div., Rockwell Spring & Axle Co., Jackson, Mich.
Tinnerman Products, Inc., Dept. No. 16, P. O. Box 6688, Cleveland 1, O.
Tipp Manufacturing Co., Tipp City, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titeflex, Inc., Hendee St., East Springfield, Mass.
Titus Mfg. Corp., Box 810, Hiway 20 West, Waterloo, Iowa
Titusville Iron Wks. Co., The, Titusville, Pa.
Tjernlund Mfg. Co., 2140 Kasota Ave., St. Paul 14, Minn.
Todd Shipyards Corp., Products Div., Columbia & Halleck Sts., Brooklyn 31, N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Time Controls, Inc., 33 Grove St., Mt. Vernon, N. Y.
Torrington Co., The, Bantam Bearings Div., South Bend 21, Ind.
Torrington Mfg. Co., The, Torrington, Conn.
Torrington Mfg. Co., The, Western Div., 16300 Roscoe Blvd., Van Nuys, Calif.
TOT Towers, Inc., P.O. Box 2564, 5220 Lawndale, Houston 1, Texas
Toungate & Coats, P. O. Box 9156, Allandale Station, Austin 17, Tex.
Tracerlab, Inc., 1601 Trapoleo Rd., Waltham 54, Mass.
Trade-Wind Motorfans, Inc., 7755 Paramount Bldg., Rivera, Calif.
Trane Co., The, La Crosse, Wis.
Tranter Mfg. Inc., Lansing 4, Mich.
Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.
Trent Tube Co., 430 Church St., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Conduit & Cable Co., Inc., Triangle & Jersey Aves., New Brunswick, N. J.
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Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
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Trimount Instrument Co., 3119 W. Lake St., Chicago 12, Ill.
Trindl Products, Ltd., 1807-11 S. Clark St., Chicago 16, Ill.
Trion, Inc., 1000 Island Ave., McKees Rocks, Pa.
Tripar Products, Inc., 14641 West Eleven Mile Rd., Royal Oak, Mich.
Triplex Heating Specialty Co., Inc., 252 N. Grant, Peru, Ind.
Trombetta Solenoid Corp., 329 N. Milwaukee St., Milwaukee 2, Wis.
Tropical Paint Co., 1244-82 W. 70th St., Cleveland 2, O.
Tropical Tape Div., 899 Country Club Circle, Ft. Lauderdale, Fla.
Troy Engine & Machine Co., 20 Railroad Ave., Troy, Pa.
Truflo Fan Co., 523 Main St., Harmony, Pa.
Tru-Flo, Inc., 1622 Fillmore Ave., Buffalo, N. Y.
Truscon Laboratories Div., Devoe & Raynolds Co., Inc., Caniff and Trunk R. R., Detroit 11, Mich.
Truscon Steel Div., Republic Steel Corp., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Parcel Post Station Box No. 72, Westfield, Mass.
Tube & Hose Fittings Div., Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, O.
Tube Manifold Corp., 415 Bryant St., North Tonawanda, N. Y.
Tube Turns, A Div. of National Cylinder Gas Co., 224 E. Broadway, Louisville 1, Ky.
Tube Turns Plastics, Inc., 2929 Magazine St., Louisville 1, Ky.
Tubenfin Coil Co., 220 Broadway, Houston 12, Tex.
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Tuck-Aire Furnace Co., 2045 Evans Ave., San Francisco 24, Calif.
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Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
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Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill.
Tuttle & Bailey, Div. of Allied Thermal Corp., Corbin Ave., New Britain, Conn.
Tweco Products Inc., P. O. Box 666, Wichita 1, Kan.
Twin Disc Clutch Co., 1310 Preston, Rockford, Ill.

Typhoon Air Conditioning Co., Div. of Hupp Corp., 505 Carroll St., Brooklyn 15, N. Y.
Typhoon Heat Pump Co., Div. of Hupp Corp., 2001 Garcia Ave., P. O. Box 1123, Tampa, Fla.

U

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U. S. Expansion Bolt Co., P. O. Box 827, State St. & P.R.R., York, Pa.
U. S. Flexible Metallic Tubing Co., 454 East Third St., Los Angeles 13, Calif.
U. S. Plug & Fitting Co., Wellington, O.
U. S. Valve & Mfg. Co., East Grand Ave., S. San Francisco, Calif.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
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Unifilter Co., 43800 Grand River Ave., Novi, Mich.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Uniflow Valve Corp., 19 Quine St., Cranford, N. J.
Unimax Switch Div., W. L. Maxson Corp., Ives Rd., Wallingford, Conn.
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Union Electric & Mfg. Co., 1057 Summit Ave., Jersey City, N. J.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Malleable Mfg. Co., Clark St., Ashland, O.
Union Metal Wks. Co., Inc., 128 Carter St., Chelsea 50, Mass.
Union Pipe Fitting Co., Fort Atkinson, Wis.
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United Cork Companies, 1 Central Ave., Kearny, N. J.
United Electric Controls Co., 85 School St., Watertown, Mass.
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United Specialties, Inc., P.O. Box 698, El Dorado, Ark.

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United States Gasket Co., 602 N. 10th St., Camden, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.
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United States Stoneware Co., Plastics & Synthetics Div., Akron 9, O.
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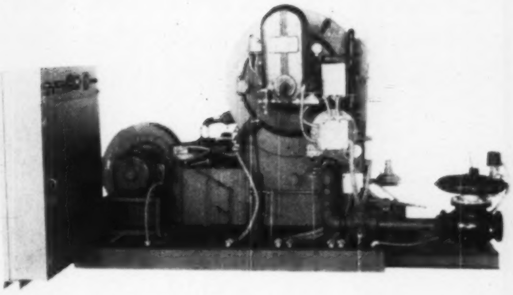

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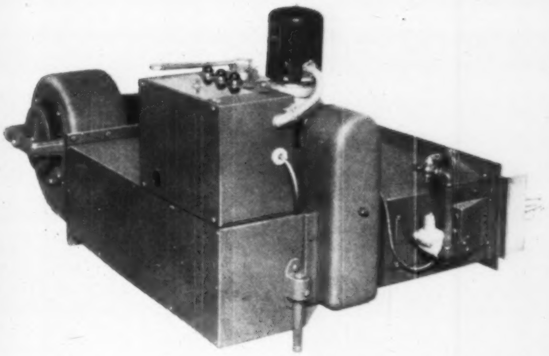

Forced Draft Gas Burner provides, in one complete unit, a fully automatic one hundred percent forced draft low pressure gas burner.

The Dynetic stresses simplicity in arrangement and control without sacrificing safety or efficiency.

Available in fourteen sizes: capacities from 800,000 to 18,000,000 Btu/hr.

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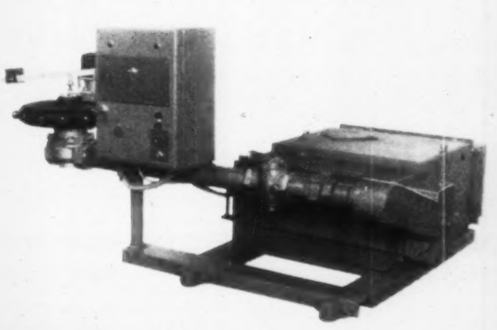

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TULSA, OKLAHOMA

Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

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The SERIES H

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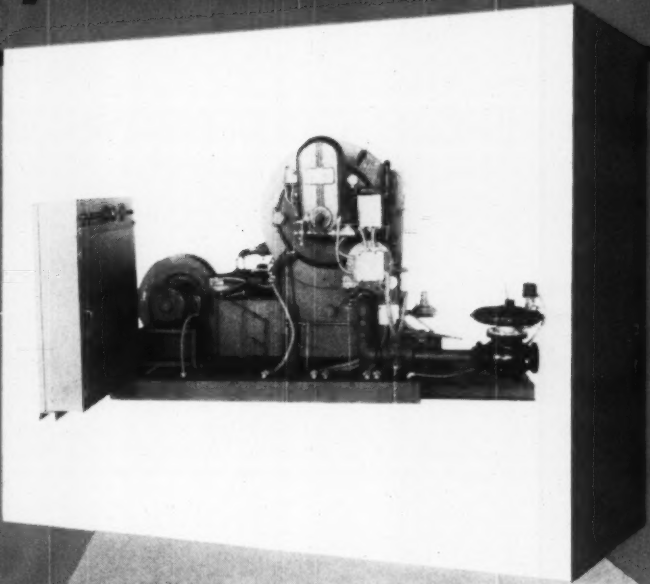

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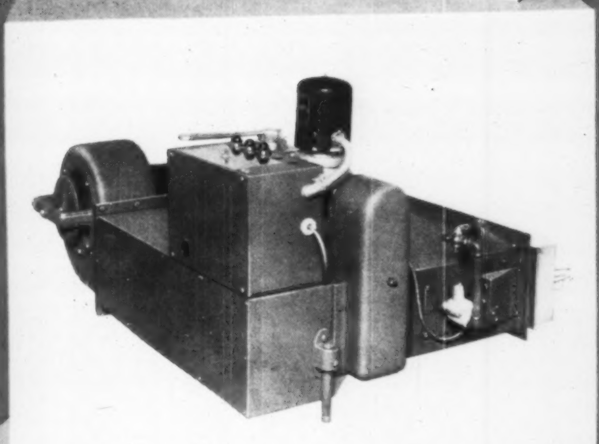

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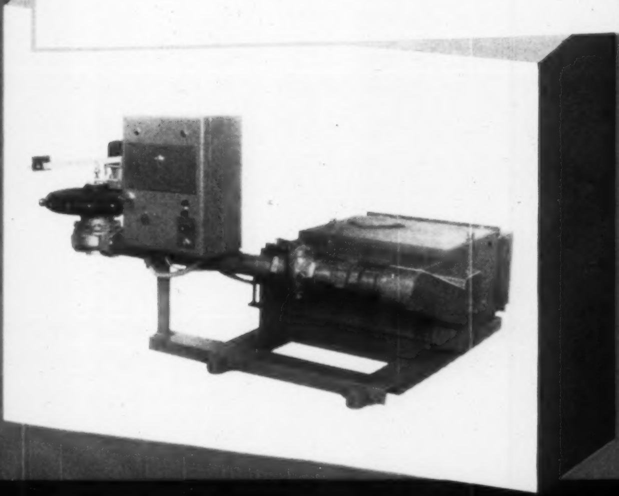

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